THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

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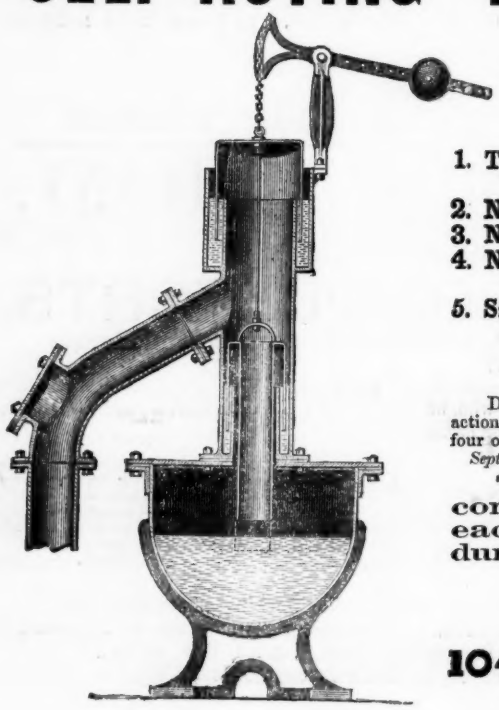

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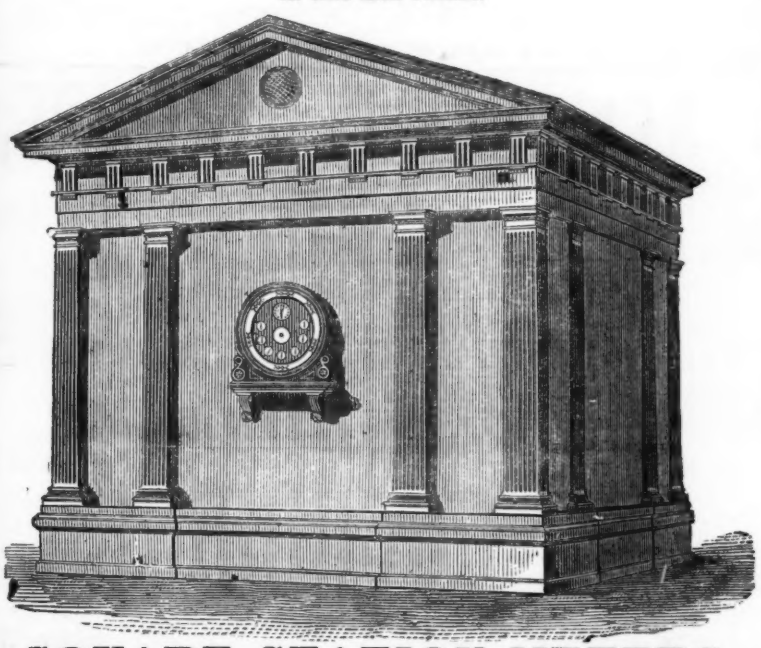

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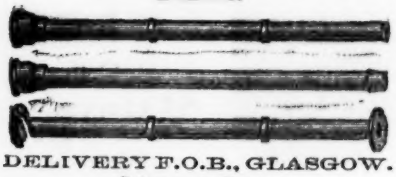

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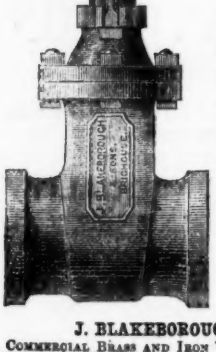

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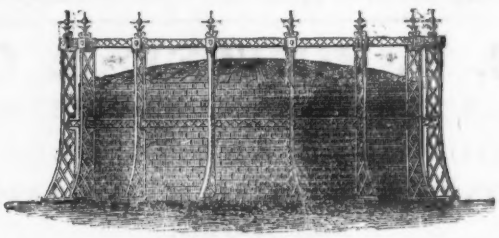

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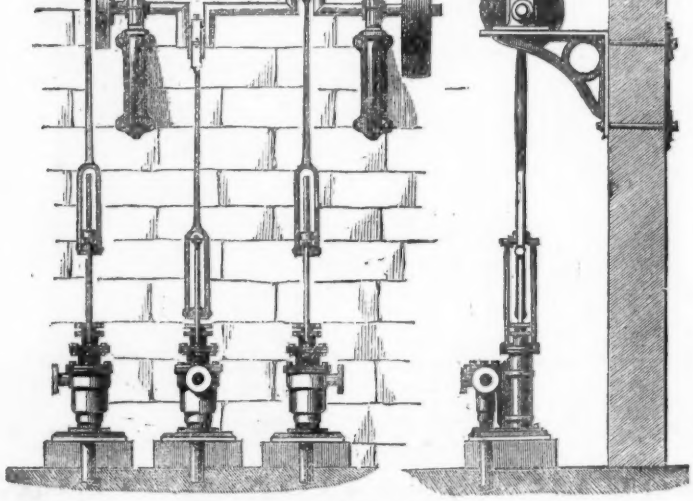

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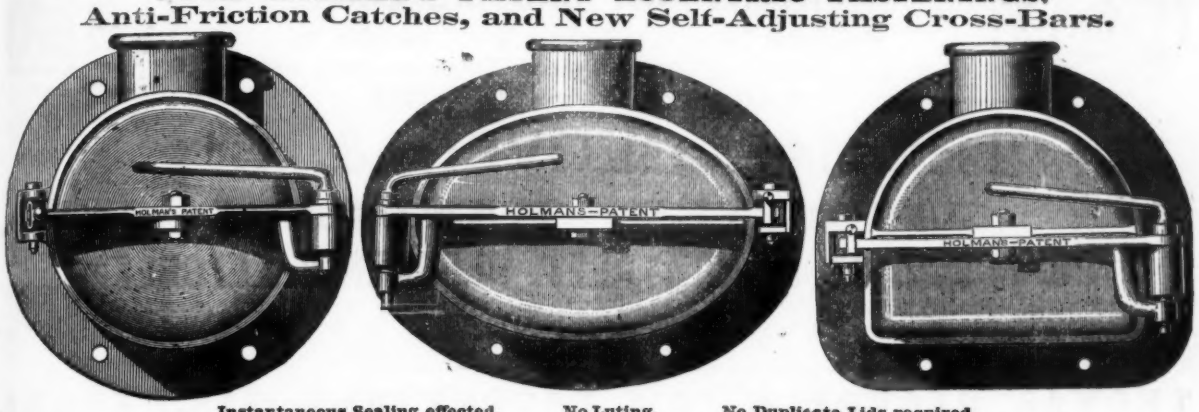

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TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

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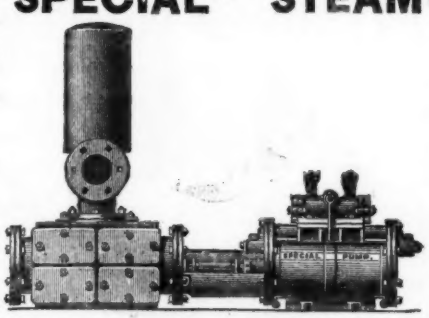
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



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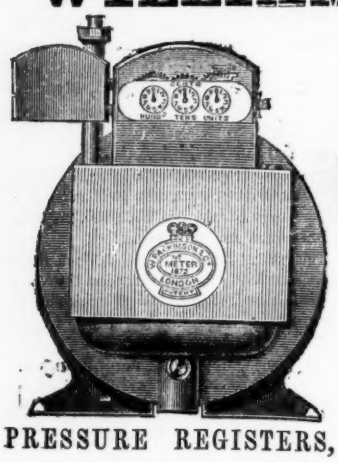

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STATION-METERS & GOVERNORS,

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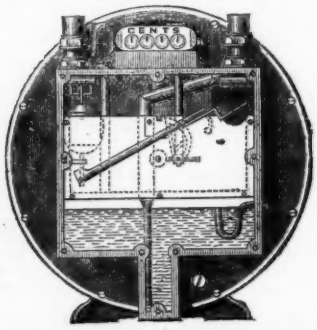

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CONTENTS.

Circular to Gas Companies:— PAGE
Pressure Test in the Gas-Works Clauses Consolidation Bill . . . 865
The Gas Apparatus Exhibition at Birmingham . . . 865
Temperature of Gas in Ascension-Pipes . . . 865
Mr. Pattinson and Sulphur Tests . . . 865
Agitation for a Reduction of Price at Bradford . . . 865
How Complaints are got Up . . . 865
Meeting of the British Association of Gas Managers . . . 866
Water and Sanitary Notes:—
Failure of the Thirlmere Scheme in the House of Lords . . . 866
The Southport Bill—Rejection of Auction Clauses . . . 866
Re-committal of the Durham Water-Works Bill . . . 866
Correspondence:—
Tar and the Absorption of the Illuminants in Coal Gas . . . 867
The Influence of Washing on Illuminating Power . . . 867
Gas Testing at Newcastle-on-Tyne . . . 868
Stephan's Gases from Sewage, &c. . . . 868
The Use of Water as a Motive Power . . . 868
How is the Pressure of Gas to be Tested? . . . 868
The Temperature of Gas in Ascension-Pipes . . . 869
Air as Fuel . . . 869
Parliamentary Intelligence:—
Progress of Bills in House of Lords . . . 870
Public Health Act (1875) Amendment Bill . . . 870
Progress of Bills in House of Commons . . . 870
House of Commons Committees—
Grand Junction Water Bill . . . 870
Nottingham Water Bill—Nottingham Improvement Gas and Water Bill . . . 875
Miscellaneous News:—
Death of Mr. W. H. Whiffen . . . 869
Sewage of Hertford . . . 869
San Paulo Gas Company, Limited . . . 869
Effect of Sulphur in Gas on Cotton Goods . . . 877
Meeting of the Imperial Continental Gas Association . . . 877
Quality of the Birmingham Gas . . . 878
Meeting of the Bahia Gas Company . . . 878
Meeting of the Monte Video Gas Company . . . 879
Trade Reports . . . 881
Institution of Civil Engineers . . . 881
Sales of Provincial Gas Shares . . . 881
Water Supply of Christchurch (N.Z.) . . . 881
Liverpool Gas-Fittings Company . . . 881
Rivers Pollution Act . . . 881
Milton next Sittingbourne Gas Supply . . . 881
Epsom and Ewell Gas Company . . . 881
Dronfield Gas Company . . . 881
Quality of the Newcastle-on-Tyne Gas . . . 881
Manchester District Institution of Gas Engineers . . . 881
Stealing Iron from the Halifax Corporation Gas-Works . . . 882
Highbridge Gas-Works . . . 882
Landing and Storeage of Petroleum . . . 882
English Coal Mining . . . 882
Register of New Patents:—
Applications for Letters Patent . . . 882
Patents which have passed the Great Seal . . . 882
Notice of Application for Leave to File a Disclaimer and Memorandum of Alteration . . . 882
Patents which have become void . . . 882

TO SUBSCRIBERS.

In consequence of the Whitsun Holidays, the next Number of the JOURNAL OF GAS LIGHTING *will not be published until Wednesday, June* 12.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 4, 1878.

Circular to Gas Companies.

A CORRESPONDENT in another column calls attention to the provisions of a Bill now awaiting second reading in the House of Lords, entitled "An Act to consolidate, with amendments, in one Act, the provisions of the Gas-Works Clauses Acts, 1847 and 1871," so far as they affect testings for pressure. The two general Acts above mentioned contain no clauses providing for pressure-tests; but in most of the special Acts passed within the last two or three years, clauses have been introduced exactly like the 33rd and 34th clauses of the Bill now referred to. Clause 33 imposes upon undertakers the obligation to provide a testing-station, in which, among other things, the pressure at which the gas is sent out shall be recorded. So far, so good. If the Company send out gas equal to the required pressure, that should be quite sufficient; but from a variety of circumstances, over which the Company have but little or no control, pressure will vary, and consumers will complain. Supposing such complaint to be made, the Bill now under consideration, and the special Acts to which we have alluded, confer on a legally-appointed Gas Examiner the right, after giving two hours notice to the Company, "to open any street under the control or management of any Local Authority or Road Authority" between certain hours, in order to ascertain the pressure of the gas in the main as near as possible to the service-pipe of the complaining consumer; but the hours during which these tests may be made deserve to be noticed. They are the hours of maximum consumption—that is to say, from "five o'clock to ten o'clock from October to March, and from eight o'clock to eleven o'clock from April to September." It follows that the Act gives no power to test the pressure of the gas in the mains between midnight and sunset. There may be no great grievance in this at present; but as gas comes into more general use for cooking and heating purposes, it may be found necessary to make the day pressure equal to the night. We often hear complaints by those who use gas-cooking stoves, and have even heard of hundreds of dinners being spoilt for want of sufficient gas to properly cook them. Our correspondent points out other defects in the Consolidation Bill. When a legally-appointed Examiner has dug down to the main, has he any right to drill a hole in the pipe? And supposing he has, who is the party to pay the expense of opening and reinstating the street? The Bill does not make this at all clear; and, as it now stands, a consumer would undoubtedly hesitate before he himself took proceedings, or set a Local Board in motion. The Consolidation Bill we notice is no credit to those who drew it. Two or three things in it require to be made clear before the Bill can become law. Our own opinion we have given above. The pressure registered as the gas leaves the works must be taken as the pressure at which the gas is supplied.

The arrangements are now all complete for the Exhibition of Gas Apparatus by the Corporation of Birmingham, which is to be opened on the 5th inst., and continued until the 11th. The judges who have been appointed are Mr. C. Hunt, Mr. H. Hack, Gas Engineers in the employment of the Corporation; Mr. Wood, Superintendent of Fittings Department; Mr. F. W. Hartley, and Mr. H. Gore, of London; and, specially for cooking apparatus, a *chef de cuisine*, whose name has not yet been revealed. We heartily hope that the Exhibition will prove a success, and that not only the Corporation of Birmingham will profit, but that the consumers from all surrounding districts who visit the show will carry back to their homes the conviction that, at all events at this time of the year, the use of gas for culinary purposes will prove extremely economical.

We alluded, in our "Circular," last week, to a letter of Mr. Newbigging, in which he detailed experiments which conclusively showed the temperature of gas at the top of an ascension-pipe. A second letter, which arrived too late to be referred to, gave an account of further experiments made to ascertain the heat of the gas in the ascension-pipe at a short distance from the retort. These were of an extremely interesting character, and tend to prove that the high heats observed by Mr. Paterson were caused by tarry matter—naturally at an elevated temperature—which deposited itself upon the bulbs of the thermometers. We regard these experiments as of great value and importance; but the matter should not rest here. We hope further investigations will be made, and the question soon set entirely at rest.

Another matter which certainly requires investigation is the relative values of the Wright, the Letheby, and the Referees apparatus for determining the amount of sulphur in gas. No one would think of detracting from the value of the late Mr. Wright's inventions, including that for the estimation of sulphur; but we think we may say, with truth, that in every one's hands but those of Mr. Pattinson, that apparatus has failed to show more than an approximation to the true amount of sulphur contained in gas. The late Dr. Letheby gave it an exhaustive trial in comparison with the apparatus he himself devised. Mr. Pattinson's comparative experiments, as detailed in the letter which we publish to-day, are somewhat inconclusive. All we can say is, that whether the Wright, the Letheby, or the Referees apparatus be employed, the amount of sulphur found depends, to a great extent, upon the will and skill of the operator.

There is a strong agitation in Bradford to secure a reduction in the price of gas, it being believed by the consumers that keeping gas at a high price in order to aid the rates is simply robbing Peter to pay Paul. We are glad to see consumers under Corporations adopting this view. As a correspondent expressed it some time ago, "every tub should be made to stand upon its own bottom." A gas undertaking should be self-supporting. According to John Stuart Mill's principle, it would be quite as proper to levy a high police rate to cover the losses of a gas undertaking as to charge a high price for gas in order to pay for public improvements.

Dickens's Mr. Toots was not an original creation. The author must often have met with him in the journalistic world with which he was so intimately acquainted. The editor who writes letters to himself is by no means a scarce character; but the Toots of the press does not make use of great names; he makes a grievance of his own, and ventilates it as opportunity offers. Thus, as regards our own speciality, we have often found in provincial papers letters from "An Aggrieved Gas Consumer," "Dim Lights," &c., all bearing the plainest evidence that style and phraseology can convey, that they emanated from the same head—we do not say brain. The exigencies of journalism sometimes, perhaps, necessitate a resort to an artifice of this kind; but, even when sorely pressed for matter to fill a column, the journalistic Toots might be fair, and, at the same time, abstain from showing his ignorance about the matter of which he is

writing. If gas blackens the ceiling, it is, as we have often said, a simple sign that the consumer is burning good gas with a bad burner. If his furniture be "spoiled," and his "gilt cornices" be made dingy, he has only himself to blame, for it is ten chances to one that gas has nothing to do with the damage. If, for instance, a complaint was made in Swansea that the gas injured textile fabrics and gilt framings, the answer would be that the gas contains an average of only eight and a half grains of sulphur in one hundred cubic feet, and no one who knows anything about the matter would believe that, with efficient ventilation, any damage would be done by such an amount. Seriously, it is quite time that this stupid squabble at Swansea should cease. It is mainly a personal matter, in which the large majority of the ratepayers of the borough take no interest whatever. The Corporation might possibly purchase the gas undertaking at its proper price; but the town is now so overladen with debt that we have strong doubts whether the Urban Sanitary Authority could raise sufficient money for the purpose. The very few in the Council who advocate the purchase, do so with a hope that, by plundering the gas consumers, they might be able to relieve some of the rates of which the inhabitants now so bitterly complain. The negotiations must, however, be begun and carried on in a businesslike and proper manner. Incessant abuse, which, after a time becomes ridiculous, will do no good whatever.

The meeting of the British Association of Gas Managers, which will open at the rooms of the Society of Arts, London, on the 18th inst., under the Presidency of Mr. Corbet Woodall, Engineer of the Phœnix Gas Company, promises to be one of unusual interest. The list of communications to be read, which appears in our advertisement columns, contains some which ought to give rise to valuable discussions, and we almost fear that too much work has been cut out for the fragments of the two days which can be given to the reading of papers and the debates thereon. The Committee will, of course, exercise their discretion as to the papers to which prominence shall be given. We do not here put them in the order in which they appear in the programme, but take the liberty of pointing out which, in our opinion, are most worthy of attention. Every one in the list deserves serious consideration, but so much time is necessarily taken up with the formal business of the Association, and so little is, therefore, left for the discussion of scientific and practical matters, that a certain number of communications will have to be "taken as "read." We, therefore, suggest the papers which, in our humble opinion, relate to subjects on which the experience of the Members will be very valuable. The prevention of waste in gas-works is a most important matter, and few in the profession are, perhaps, as capable of dealing with it as Mr. Hunt, of Birmingham. Waste prevented means profits increased, and the only standard employers recognize in the excellence of a Manager is the amount of profit he can make. A new standard for determining the illuminating power of gas is undoubtedly desirable. We believe in candles, but shall be happy to accept any other standard which can be considered as reliable in scientific truth, and as significant in expression. The causes tending to retard the application of gas to heating purposes, whatever they may be, well deserve attention. We are always looking forward to the day when gas will be largely used for other than illuminating purposes. We wish, in the interest of Gas Companies, to see the day consumption equal that of the night, and, for this reason, shall be glad to hear what, in Mr. Travers's opinion, prevents this desirable end, and also any suggestions tending to the removal of the obstacles. We cannot hear too much about the application of ammoniacal liquor as a purifying agent. The expression now is axiomatic, that the products of the distillation of coal furnish all the means for purifying gas; but the matter has not yet been worked out to a satisfactory conclusion. Every experiment, however, which tends to elucidate the matter ought to command the serious notice of Gas Managers. Differences of opinion exist as to the methods which should be employed in the analysis and valuation of residual products. There are sellers and buyers, and it can hardly be expected that the two will agree as to the money value of a residual product until a process is devised which will give incontestable results. A correct method therefor is a desideratum. The purification of gas by liquids; the construction of retort-settings; brick, concrete, and composite tanks; cooking apparatus; and improvements in carbonizing apparatus, are amongst the other subjects upon which papers are promised at the forthcoming meeting. The transfer of gas-works, to be brought forward by Mr. A. Penny, is, to Shareholders, a most important business; so is the relation of capital to revenue, which will be treated of by Mr. G. Livesey. These latter subjects, though perhaps not specially concerning the functions of Gas Managers, are of the greatest general interest, and we shall be happy to learn what two such experienced authorities have to say on these matters. The lecture by Mr. Wills is to be on "The "Products of Combustion," and the excursions this year will form interesting features in the proceedings, of which we trust as many Managers as possible will avail themselves. The day following the business meetings will be devoted to an inspection of the largest gasholder in the world, now in course of construction at the works of the Phœnix Gas Company, in Kennington Oval, and subsequently an excursion to Bushey Park and the works of the Grand Junction Water Company, at Hampton. On Friday, June 21, the Members are to start for a trip to Paris, where the Société Technique have made arrangements to afford our countrymen a most cordial reception and the means of a most agreeable and instructive visit.

Water and Sanitary Notes.

THE Standing Orders Committee of the House of Lords have declined to suspend the Standing Orders in the case of the Manchester Corporation Water Bill. The Thirlmere scheme is, therefore, shelved for the year, and we do not think its prospects are improved for another session. It seems strange that, amended by a Select Committee of the House of Commons, it should be held not to comply with Standing Orders, when the provisions indicating non-compliance have been inserted by the other House. It would have been perfectly competent for the Lords to have rejected a Bill on its merits, but they have chosen to avail themselves of a merely technical point. The Bill will, of course, be brought forward next year, and will, no doubt, receive the sanction of the Commons; but with apparently a strong opposition in the Lords, its ultimate fate must be considered uncertain. Perhaps, however, when the measure is fully considered, the wants of Manchester and the neighbourhood made plain to their lordships, and the advantages which may be derived by towns along the line of aqueduct on the execution of the scheme appreciated, the Bill may be allowed to become law.

The Bill of the Southport Water-Works Company, which passed the Commons unopposed, had in the Lords to encounter the opposition of the Corporation of the borough. Why the Corporation did not oppose in the House of Commons must be a mystery to every one but themselves. In the Lords they attempted to force auction clauses on the Company, but the Committee declined to insert them. It would seem that the dividends paid by the Company have varied considerably in amount, and as there was really no prospect of any considerable premiums being realized at public sales of shares, the auction clauses are just as well left out of the Bill. We may, at the same time, congratulate the Shareholders of the Company upon the decision, and we think we may also congratulate the inhabitants on the fact that the water undertaking is now likely to remain in the hands of the Company for a very long time. They have served Southport excellently well, and now, in extending their limits, they will confer a great blessing on additional communities. It may be regretted that the Lords reduced the amount of capital asked for by the Company, because £200,000 was not a large sum when the probable future wants of Southport and the neighbourhood are considered, and it is very undesirable to compel Companies often to go to Parliament.

Earl Redesdale has taken upon himself to obtain the recommittal of the Bill of the Durham Water-Works Company, in order to give the Corporation and the Urban Sanitary Authority the opportunity of opposing the measure. How it could happen that the Town Council did not become alive to the obnoxiousness of the Bill before it was introduced to Parliament we cannot imagine, and we think a body so culpably negligent of what they consider the interests of their constituents, deserve but little consideration at the hands of the Legislature. They now propose to hold a town meeting, in conformity with the Borough Funds Act, and, if supported by the ratepayers, will offer strong opposition to the Bill before the second Committee. It may be admitted that the water of the Wear is not the purest in the kingdom, and that it is not greatly improved by filtration; at the same time it would be difficult to show that the inhabitants of Durham have suffered from drinking the water. They have a fair average death-rate, and, so far as we know, epidemic disease is not more common in Durham than in cities more fortunately situated as to water supply. The somewhat unusual step taken by Lord Redesdale will considerably delay the progress of the Bill. The town meeting is convened for the 12th inst., and his lordship has promised to postpone the sitting of the Committee, so that the opposition may be fully heard.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

TAR, AND THE ABSORPTION OF THE ILLUMINANTS IN COAL GAS.

SIR,—I observe in the last JOURNAL that Mr. W. White, of Abersychan, claims to be first to have drawn the attention of Gas Engineers to the action of the dip in depriving the gas of some of its richer illuminants.

Whilst giving full credit to Mr. White for doing good service, by his pamphlet, in calling attention to this important matter (providing, at the same time, by means of his valve, a substitute for the dip), I cannot recognize the justice of the claim he puts forth.

The question, however, of priority in directing attention to the subject is of greatly less moment than the subject itself, which is one well deserving the thoughtful consideration of Gas Managers. It is principally with a view to ventilating the question that I write the present letter.

A simple gas is usually described to be a permanently elastic fluid, under the ordinary conditions of temperature and pressure. Coal gas, which is compound in character, does not answer to that description. When it has been distilled from the coal by the agency of heat, and issues from the retort up the ascension-pipe into the hydraulic main, there is carried in suspension, along with the permanently gaseous fluids, a number of hydrocarbon and other vapours, which condense at temperatures varying from about 160° or 140° Fahr. downwards.

These hydrocarbons contribute largely to the illuminating power of the gas, and it is, of course, desirable to retain them in the permanently gaseous form. Some of these hydrocarbons, especially such as are of the greatest density, are reduced to the liquid state by the mere mechanical reduction of their temperature; whilst others of them of equal specific gravity, and many of those of lower density, undergo a change from the gaseous to the liquid condition, by reason of the solvent or absorbent action of the liquid contents of the hydraulic main, through which, by reason of the dip, they have to pass; or with which, in the absence of dip, they come intimately in contact. The former may be classed as hydrocarbon vapours, the latter as gaseous hydrocarbons. It is thus evident that the process of condensation commences at the hydraulic main, the results there produced materially affecting the quality of the gas.

Those hydrocarbons that are changed to the liquid form by this slight diminution of temperature, it is probably impossible to retain in the gas, under any circumstances whatsoever. With the more volatile, though still heavy, hydrocarbons, the case is different; the power of retaining them in the permanently gaseous form is within the bounds of possibility, and these are, therefore, of the greatest interest to the gas manufacturer.

A further class of hydrocarbons are not liquefied at all under ordinary conditions, and there should never be any difficulty experienced in keeping them in the gaseous state. I forbear here to do more than merely refer to the fact, well known to Chemists and Gas Engineers, that the whole of the illuminants of the gas can be eliminated by the employment of certain means, and, indeed, they occasionally are, by the neglect of ordinary precautions.

Of the second class of hydrocarbons—viz., those which, though of high specific gravity, it is practicable to retain in the gaseous form, I shall now speak. Their retention in the gas, and how this is the most likely to be accomplished—or at least how best to remove all impediments to that end—greatly concerns the gas maker. I have assumed that the mere reduction of temperature between the retort mouth and the hydraulic main will not affect their gaseous condition. Under what other circumstances, then, are they condensed in the hydraulic main, and in the subsequent mains leading to the condenser? The answer is clear, and is what I have already indicated—viz., by the affinity which exists between them and the already liquefied hydrocarbons present in the mains.

Some remarkable notes, corroborating these views in several important particulars, are recorded by Mr. W. Young, being the result of a number of experiments made by the late Mr. Cusiter, in 1868, on the absorption of the light-giving constituents of coal gas by the heavy hydrocarbon oils, his attention being drawn thereto when experimenting with glycerine as a substitute for water in gas-meters.*

After having satisfied himself that the disadvantages attending its use were not compensated by its advantages, he turned his attention to other liquids which might, he thought, be suitably applied for the like purpose. One of these was mineral oil of 840° specific gravity. The effect of this with 28-candle gas was to reduce the illuminating power to 14 candles; and with gas of 35 candles, to 16·1. During the winter of 1873-4 he repeated the experiments, and made some additions to the number. These included paraffin spirit of 768° specific gravity, the distillate of crude paraffin oil of 810° and 860° specific gravity, and blue oil of 895°, all at the temperature of 60° Fahr. In each case the action of the fluids on the illuminating power of the gas was appreciable, but was greater with the denser oils. On passing the 28-candle gas through the paraffin spirit of 760° specific gravity, at a temperature of 60° Fahr., the result was *nil*; when the temperature was reduced to 50° Fahr., the loss in illuminating power was 5 per cent.; and when the temperature was raised to 70° Fahr., there was a gain of 7 per cent. On the other hand, by passing the gas through either of the heavy oils, the loss of light amounted to 65 per cent.; and on agitating the gas and the oil together, the light-giving constituents were almost entirely removed—the gas, after treatment, consisting of light carburetted hydrogen, hydrogen, and carbonic oxide. Mr. Young deduced from these experiments various facts of great interest, having reference to the means thus afforded of ascertaining the per centage of hydrocarbons in a given quality of gas, but these are foreign to the present subject.

In a further paper on the same subject,† accompanied by experiments, Mr. Young showed that so great is the solvent action of heavy hydrocarbon oil (boiling point 180° Fahr.), that hydrocarbons, such as olefiant gas, which are permanent gases at ordinary temperatures, may be reduced to the liquid form in passing through it. He further showed that if, instead of allowing the gas and mixed hydrocarbons to cool together, the gas, saturated with the vapour of the lighter hydrocarbon liberated by heat from the mixed fluids, were transfused into a separate vessel, thereby preventing the heavier hydrocarbon from coming in contact with, and reabsorbing the lighter, the gas would remain saturated with the vapour from the more volatile fluid.

These important facts lead to but one conclusion—viz., that the practice so largely pursued and recommended, of allowing the whole of the tar to flow along with the gas through an extensive range of pipes to the condenser, both being gradually cooled together in the passage, is founded on an erroneous estimate of the results that follow thereon, is highly objectionable, and must be condemned.

Mr. R. H. Patterson, with that wise insight which characterizes his investigations, recently gave expression to his views on this subject in an able article,*, in which the fallacy of the prevailing opinions with regard to the practice of keeping the gas in contact with the tar is very clearly shown.

The cooling of the gas gradually is a provision the wisdom of which is unquestionable, and the plan of causing it to make the circuit of the retort-house in pipes is probably the best method of accomplishing that object; but the deposited tar in the hydraulic main and in the foul main at the point, as near as can be ascertained, where its temperature has fallen to about 110° or 100° Fahr.—the temperature at which its absorbent powers come into most active operation—should be drained away direct to the tar-well by its own separate conductor.

The chief advantages hitherto believed to accrue from the lengthened contact of the gas with the tar are—first, the absorption by the latter of naphtha line that would otherwise be carried forward to be deposited, by reason of the decrease in temperature, in the mains on the works, and even in the street-mains, service-pipes, and the internal fittings on the premises of consumers; and, secondly, the absorption also of a considerable portion of the obnoxious sulphur and other compounds.

These advantages will not be forfeited by the direct removal of the bulk of the tar, because sufficient will be left in the circuitous gas-main to absorb any excess of naphthaline vapour present, and even to assimilate a portion of the sulphur impurities. Besides this, as the general effect will be to leave a larger proportion of the gaseous hydrocarbons in the gas, these, by virtue of the power which they possess in common with the liquid hydrocarbons, of assimilating—and, in this special case, of suspending—other hydrocarbons, will necessarily assist in retaining in the permanent form a portion of the naphthaline that would, in presence of the greater bulk of tar, have been liquefied and deposited. By a similar train of reasoning, the fact of the inferior quality of the tar produced from the richer cannels, as compared with that from coal, may be explained.

In dealing with this subject, it has been assumed by some that no absorbent action is likely to result so long as the tar with which the gas is in contact is at a temperature of about 100° Fahr. and above, and that, therefore, the dip in the hydraulic main causes no diminution in the amount of hydrocarbon gases present. It has even been assumed that the tar in the main gives off a proportion of hydrocarbon vapour, and in this way increases the illuminating power of the gas. On reflection, however, it will be plain that this argument is altogether untenable, for it is scarcely possible to conceive that hydrocarbons which have already been liquefied at a high temperature can again, at a lower temperature, assume the gaseous or vaporous form. There can be no doubt that the tar has an absorbent action, less or more, at all temperatures, being greatest at the lowest, and this being so, the dip must have a prejudicial effect upon the illuminating constituents of the gas.

5, *Norfolk Street, Manchester, May* 29, 1878. THOS. NEWBIGGING.

THE INFLUENCE OF WASHING ON ILLUMINATING POWER.

SIR,—The following remarks are prompted by your editorial notes in your issue of the 21st inst. You seem inclined to think that gas in which all the light naphthas are taken up (and not, as at present, only a portion of them, the remainder being in the tars) will not stand the necessary washing. From experiment and practice, I am convinced that such gas will not only stand washing, as well as gas made in the ordinary way, but will withstand cold, and keep as well as ordinary gas. My reasons for thinking so are derived from a number of experiments, confirmed by actual working at Hamilton, Glasgow, &c.

Seeing that the great portion of the illuminants in gas are naphthas, and are of the same character as those left at present in the tars, there is no reason why the naphthas in the gas should not have been left in the tars, and the naphthas in the tars passed away with the gas—in other words, that the naphthas should change places, or, if desired, the tar could be made to rob the gas of nearly all its naphthas, or, as I advocate, the gas should carry all the naphthas from the tars. Rich gases up to 30 candles, which contain large amounts of naphthas, withstand any amount of washing at ordinary temperatures, and I can see no reason why poor gases, deficient in naphthas, should not stand washing equally well if enriched by a little extra naphtha.

In working the Aitken and Young process at Hamilton, the gas was washed in the usual manner, and it did not suffer more than ordinary gas. At the Corporation works, Dalmarnock, Glasgow, the gas was washed with a steam jet, and did not suffer by washing more than ordinary gas does. During last winter, when using the process at these works, the temperature of the gas leaving the condenser was for days from 33° to 35° Fahr., and the illuminating power never fell below 30 candles. The coal used was Provanhall, which in actual working yielded as under:—

	Gas made per Ton of Coal.	Illuminating Power.	Sperm per Ton of Coal.
Patent process . . .	9464 feet . .	30·04 candles . .	975 lbs.
Ordinary process . .	9053 „ . .	26·28 „ . .	816 „

Increase in sperm value by patent process, 19·5 per cent.

As you are aware, the gases made at Hamilton by the old and new processes were tested by a Sub-Committee of the West of Scotland

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* Proceedings, West of Scotland Association of Gas Managers, October, 1874. (See JOURNAL, Vol. xxiv., p. 571.)

† Proceedings, West of Scotland Association of Gas Managers, April, 1875. (See JOURNAL, Vol. xxv., p. 803.)

* "On Keeping Gas in Contact with Tar." (See *Engineering*, Vol. xxii., p. 438.)

Association of Gas Managers, who reported an increase in sperm value by the new process of *over* 20 per cent.

I think it is beyond question that the gas made by the patent process will not only stand washing as well as gas made in the ordinary way, but will also withstand cold as well, and keep without deteriorating more than ordinary gas, provided always that the gases are of equal illuminating power.

As regards the permanency of the gas, I have to state that, at Dalmarnock gas-works, gas made by the patent process was kept in a holder for seven days, and during nearly all that time a keen frost prevailed. The gas when put into the holder was somewhat over 30 candles, and when tested at the end of the week it was found to have lost about 5 per cent. of its illuminating power. This loss, I think you will agree with me, is not greater than what 30-candle gas, made by the ordinary process, would have lost under the same circumstances.

All the particulars published about this process have been results got from working with second-class cannels, or with third-class cannels and shales; but experiments have been made which prove that a greater gain per cent. is got from working the process with common coals, the increase being in these trials from three to four candles.

HENRY AITKEN.

Darroch, near Falkirk, May 29, 1878.

GAS-TESTING AT NEWCASTLE-ON-TYNE.

SIR,—In reply to Mr. George Livesey's letter in your JOURNAL of last week, I have to say that Wright's sulphur-testing apparatus is used by me in testing the gas at Newcastle-on-Tyne. There is no reason why this should not be stated in the reports I make to the Town Council, and I will see that it is done in future. The reason I continue to use this apparatus is simply because it was the apparatus in use in Newcastle-on-Tyne when the limit of 17 grains of sulphur per 100 cubic feet of gas was fixed by the Newcastle and Gateshead Gas Company's Act of Parliament; and I should think it as unfair to the Gas Company to use an apparatus which shows a higher amount of sulphur, as I should think it unfair to the public were I to use a standard illuminating power test which gives a higher result than the Sugg-Letheby burner, also in use when the Act was obtained, and which is still used here.

Mr. Livesey appears to think that the apparatus I employ shows only about one-third the amount of the sulphur that is shown by the London Gas Referees sulphur-testing apparatus when testing the same gas. In this he is very much mistaken, as, I think, I shall be able to show. Some time ago I had occasion to compare the results obtained in testing the same gas with the London Gas Referees apparatus, the Letheby apparatus, and Wright's apparatus. The three tests were all going on together in the same room at the same time, so that there can be no doubt the same quality of gas was burnt in each apparatus. Each test was continued over 24 hours. The following figures show the number of grains of sulphur per 100 cubic feet of gas obtained by the various tests:—

	Wright's	Gas Referees.	Letheby's.
No. 1	18·64	19·77	Not used.
„ 2	13·69	15·13	10·66
„ 3	11·42	12·77	8·68
„ 4	8·77	9·81	7·16

It will be seen that the sulphur indicated by the Gas Referees apparatus in no case exceeds the sulphur indicated by Wright's by more than 1½ grains per 100 cubic feet. I confess I was somewhat astonished at these results, for, knowing as I did that Wright's apparatus had been discarded in some places in favour of the Letheby apparatus, I was not prepared to find that the sulphur arrested by the former was greater than in the Letheby apparatus. It is but fair to state that the Letheby cylinder used was one of the older and larger kind—about 7 inches in diameter—which would not give such high results as the smaller cylinder more recently adopted.

That Wright's apparatus, when properly used, gives results which agree very nearly with those given by the Gas Referees test receives indirect corroboration also from this fact: I was present when Dr. Pole tested the Newcastle gas for sulphur by Mr. Vernon Harcourt's colour test. The test made indicated 3 grains of sulphur, which, on being added as usual to the hypothetical 7 grains—supposed to exist in the gas, in a form not indicated by the test, in order to assimilate it to the Gas Referees test—makes 10 grains. My test by Wright's apparatus, taken at the same time, indicated 9·5 grains of sulphur per 100 cubic feet.

I think I am justified by the above experiments in coming to the conclusion that the Newcastle sulphur tests may be very nearly converted into Gas Referees sulphur tests by adding 1½ grains to the former.

I have had abundant proof that Wright's apparatus will indicate a large quantity of sulphur in the gas, if a large quantity be present; for when any irregularity takes place in the works in the changing of purifiers, or in the action of the scrubbers, the amount of sulphur has sometimes risen to about 30 grains, and even between 40 and 50 grains per 100 cubic feet of gas. In recovering from these accidents, the sulphur gradually decreases again, test after test, until the normal quantity of from 7 to 9 grains is again reached.

Mr. G. Livesey had the opportunity of knowing of the above comparative figures some time ago, for I gave them in evidence before the House of Commons Committee on the Crystal Palace Gas Company's Bill of last year, when, if I mistake not, this gentleman was present. Instead of attempting to throw discredit upon the tests of Newcastle gas, by sneering and by making vague assertions, it would have been much more to the purpose if he had attempted to show, by experiments, that the relation between the two sulphur tests is different from what I then pointed out.

JOHN PATTINSON.

75, *The Side, Newcastle-on-Tyne, May* 30, 1878.

STEPHAN'S GASES FROM SEWAGE, ETC.

SIR,—The notice in your JOURNAL of the 28th ult. has been pointed out to me; and, as you appear to have somewhat misunderstood my processes, I should be glad if you would give me the opportunity of replying, in your next issue, to the queries which you have put.

You were wrong in placing foremost in your notice the manufacture of the oxyhydrogen gas. This should have come after that of the carburetted hydrogen gas, of which it is a result, and has yet to be fully demonstrated by me in practice before its working can be thoroughly understood. I am able to do all which my patent embraces, and this will be shown in due time, but for the present I prefer to treat of the carburetted hydrogen light, which has been already seen by a large number of scientific gentlemen (including the Birmingham Gas Engineers to whom you refer), and the public generally, and the details of which are now becoming pretty well understood. I shall be very happy if you can favour me with space to give a description, in an early paper, of the oxyhydrogen process; and, as far as the limits of a letter will allow, explain the uses I propose to put it to. I am aware of the explosive character of the gas, under certain well-known conditions, but such is rendered impossible under my system.

I will take your objections to my method of manufacturing the carburetted hydrogen gas in the order in which they appear in your notice:—

1. You say I "must have exhibited something which gave a good light—a light that could not be obtained by any treatment of sewage deposit." And you hint that, in place of sewage, I must have employed "lumps of chalk saturated with petroleum, coal, coal dust, and even creosote." I can only give a direct negative to these assumptions. The lights I have displayed have been produced from either bones or sewage and limestone only, and the residuals have been, in the retort, building lime and calcined bone (worth double the price of green bones, and finding a ready market), and, in the condenser, ammoniacal liquor, pitch, tar, and grease. It must be obvious that, where water, limestone, and bone are used, *two* of these articles, when done with for gas-making purposes, are more than doubly valuable than in the raw state; and, in the case of sewage, where an article costs nothing, and is, in fact, a nuisance, there is found to be remaining, after it has yielded an abundant supply of gas, similar valuable residuals to those described in the bone process, how can it be doubted for a moment that what I offer to the public, and which need not be prejudicial to gas companies, whose works and mains are equally available for my system as for coal gas, is of very great value, and most opportune at the present time? Of the permanent character of both gases I am certain, from a long course of experiments, having had them in the holder over 100 hours, without any perceptible loss of illuminating power. I shall be happy at any time to prove in practice to your self, or any of your subscribers, the truth of these statements.

2. You say, "A burnt sewage deposit would leave nothing but some carbonaceous dust," &c. This is an error on your part, and you could not have carefully read the particulars of my process. I do not burn, but *boil* the sewage, and it is only the subsiding pitchy matter from the boiler, after the steam has been converted into gas, which I use in the front of the retort for carburetting the hydrogen.

3. You say, "Lumps of chalk saturated with petroleum, when heated, become mere lumps of chalk again." This is wrong. Chalk by burning is converted into lime.

4. You say, "Bones when burned give off some foul oil, which is useless," &c. You must be little aware of the result of bone calcination, or you would not have made such an assertion. Bone gives off, under a low red heat, an extraordinary volume of olefiant gas, which being taken up by hydrogen will give a light of high brilliancy—to speak within the mark, of 30-candle power and upwards.

As to the other remarks in your notice, I am quite content to believe that your opinion as to facts and motives will be very much modified when you become better acquainted with my processes and their great utility.

JOHN A. STEPHAN.

Derby Villa, Rainbow Hill, Worcester, June 1, 1878.

[We, of course, gladly allow Mr. Stephan to state his own case in his own way, but we have nothing to alter in reference to the remarks we made upon his process last week. If Mr. Stephan can teach us how to make, at a cheap rate, a highly luminiferous gas, and at the same time furnish valuable residuals, we shall willingly give due publicity to his method.—ED. J. G. L.]

THE USE OF WATER AS A MOTIVE POWER.

SIR,—In your reprint, in the JOURNAL of the 21st ult., of my paper on water power, I find that all references to the "Duncan" water-meter have been altered to "Deacon" water-meter. This may cause some confusion, and I therefore beg to explain to you that the Duncan meter (of which I enclose a sketch) is an entirely different instrument from the "Differentiating Waste Water-Meter," patented by Mr. Deacon. The latter is not, and cannot be, used for purposes of power. It is used to record automatically, on a diagram, the volume of water flowing through distributing mains at every moment throughout the day.

J. PARRY.

Municipal Offices, Liverpool, June 1, 1878.

[In reading proofs of the paper, it was thought by our Sub-editor that the word "Duncan" was a misprint for "Deacon." We apologize to Mr. Parry for the error, and will give a description of Mr. Duncan's water-meter in an early number.—ED. J. G. L.]

HOW IS THE PRESSURE OF GAS TO BE TESTED?

SIR,—Will you permit me to point out one or two curiosities in the proposed Gas-Works Clauses Act, which seem hitherto to have escaped notice? We have, for the first time, an attempt to prescribe something definite on testing for pressure, but what is the result.

In clause 17 we have the old story of what the pressure is to be from sunset to midnight, and from midnight to sunset "at the main, as near as may be to the junction therewith of the service-pipe supplying such consumer." As far as I know, no one ever knew how this was to be ascertained; but, by a very wide interpretation, it might mean that the pressure should be taken on the consumer's premises, as near as may be to the main from which he is supplied, all gas on the premises being extinguished, and due allowance made for the height of the point where the testing takes place above the main; but in clause 33 we find that the apparatus for testing pressure is to be in the testing-place provided by the undertakers, as, if the pressure were to be then tested without any reference to its position. When, however, we come to clause 34, we

find these words (after prescribing that the Gas Examiner may test illuminating power and purity on any day between 5 and 10 p.m. in winter, and 8 and 11 p.m. in summer), "and may also on any day, *between the hours aforesaid*, test the pressure at which the gas is supplied at such other places as he may think fit, giving two hours previous notice to the undertakers of the time and place at which such testing will be conducted, and may, for the purpose of such testing, open any street under the control or management of any Local Authority or Road Authority."

No provision is made for who is to bear the expense of opening the street; nor, as far as I can see, when the street is open, has the Gas Examiner any power to interfere with the Company's main so as to put on his pressure-gauge. Is this all included in the power to open the street? Supposing, however, that these difficulties are got over, the words, "between the hours aforesaid," preclude any possibility of testing between midnight and sunset, so that part of clause 17 prescribing the pressure during that period is a dead letter, while the obligation to give two hours notice to the Company would effectually ensure the pressure being in accordance with the Act when the testing was made, even if it had not been so previously. Fancy the absurdity of a Gas Examiner going with a squad of paviors and gas-fitters to open the main for the purpose of testing the pressure near the junction of the service of a complaining consumer, who, in all probability, is suffering (if from anything at all) from some defect in his own fittings! Will the said consumer pay for the job, or are Local Authorities expected to do so?

CHAS. HEISCH.

City Gas Examiner's Office, 79, Mark Lane, E.C., May 31, 1878.

THE TEMPERATURE OF GAS IN ASCENSION-PIPES.

SIR,—I was led, by the interesting letter of Mr. R. O. Paterson, to give some little attention to this question. From the reply of Mr. Newbigging, it would appear that the high temperature registered by Mr. Paterson was due to some error on his part. To test the truth or otherwise of this, I examined a few of our ascension-pipes, with the following results, being careful to insulate the thermometer from the heat of the stand-pipe. The retort was charged with 2½ cwt. of Wigan Arley coal, six-hour charges:—

	1st Hour.	2nd Hour.	3rd Hour.	4th Hour.	5th Hour.
3 feet above the mouthpiece.	202°	200°	200°	198°	200°
Middle of pipe	134°	134°	122°	110°	104°
Top of pipe	74°	72°	70°	70°	70°

Temperature of second retort, charged at 1.15 p.m., under same conditions as above:—

	At 1.20 p.m., Higher than	At 2.15 p.m., Higher than	At 3.15 p.m., Higher than	At 4.15 p.m., Higher than	At 5.15 p.m., Higher than	At 6.15 p.m., Higher than
3 feet above the mouthpiece	640°	640°	640°	640°	640°	600°
Middle of pipe	640°	504°	509°	520°	520°	480°
Top of pipe	200°	200°	198°	198°	198°	169°

Same retort two days after, under same conditions as above, charged at 1.15 p.m., the temperature was:—

	At 1.20 p.m., Higher than	At 2.15 p.m., Higher than	At 3.15 p.m., Higher than	At 4.15 p.m., Higher than	At 5.15 p.m., Higher than	At 6.15 p.m., Higher than
3 feet above the mouthpiece	320°	640°	640°	640°	380°	380°
Middle of pipe	210°	360°	378°	380°	220°	196°
Top of pipe	160°	199°	200°	199°	120°	115°

Being desirous of ascertaining what these high temperatures were due to, I succeeded in extracting some of the volatile matter, to ascertain its temperature during volatilization, which I found to be nearly 700° Fahr.

I do not see the question at all in the light that Mr. Newbigging does. I do not believe the gas has these high temperatures at all; but they are due to the tarry and volatile matter. If the gas was prevented from expanding, of course it would be as hot as the tarry matter; but, as the action of the exhauster entirely prevents this, by allowing free room for expansion, all the heat poured into the gas becomes latent, and is not registered by the thermometer at all.

I may just say that I believe Mr. Paterson was perfectly right in what he said about the high temperature he found in the retort-house, as my experiments bear him out. With regard to the difference of temperature registered in my experiments, I may add that the one showing the lowest was about the average of the whole retort-house—about 1800° Fahr., while the one registering so high was, as near as I can make out, about 2400° Fahr. It is quite evident that the temperature of the issuing volatile matter will differ in all retort-houses where different heats are used, and also in all retort-houses where the same heats are used, but different qualities of coal—that is to say, coals giving off varying quantities of moisture and volatile matter.

T. A. COLLINGE, Analyst to the Corporation.

Rochdale, May 31, 1878.

[If anything were wanting to show the necessity for accurate observation, which we have always insisted upon, in all stages of the distillation of coal, and the temperature of products as they issue from the retort, it will be found in our Correspondent's letter.—ED. J. G. L.]

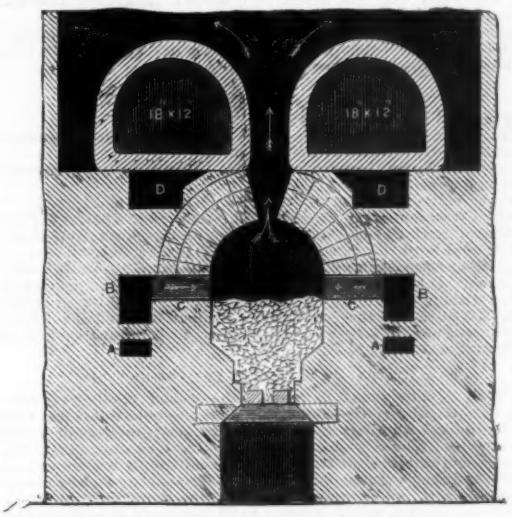
AIR AS FUEL.

SIR,—In the description given by Messrs. Wilson and Douglas of their new furnace, I recognize a very, very old face. In 1847, I made a set of drawings for the late Mr. George Lowe of a retort setting and furnace, which he called his "Blow-Pipe Furnace." Its object was to utilize more effectually the carbonic oxide generated by the vapour passing through the incandescent coke, which was ignited above the solid fuel by the aid of air vents, or nostrils, left in the side walls of the furnace. When I was at the Chartered Gas Company's works in Horseferry Road, and had charge of the retort-houses, I found the same principle had been at work there for some years. It was, I believe, originally designed by the late Mr. Evans, sen. (father of Mr. F. J. Evans), and the only difference in the arrangement between the furnaces of Mr. Evans and Mr. Lowe was that Mr. Evans used a deep furnace, the full width at bottom, and gradually diminishing at top to about 4 inches, while in Mr. Lowe's furnace the side walls were vertical to the springing of the arch, and the nostrils, or vents for the escape of the heat, were oblong holes left in the crown of the arch. The main principle, however, was the same, that of furnishing oxygen to the gaseous compounds above the coke. It is quite a misnomer to call it an air fuel furnace; it is the carbon in the carbonic oxide which is the fuel, and the air is the cause of it burning. I enclose you a rough pen and ink sketch of the working drawing I used at Leeds in 1853, where I constructed some 50 or 60 furnaces on this plan. You will see by the sketch how the air vents were applied, the cold air being drawn in through the lower channels.

I firmly believe, when we go back to the principle of making "light," instead of *coke, tar,* and *ammonia,* and are content to use the heat generated in our furnaces for its legitimate purpose, that of evolving the gaseous constituents of the coal, then such an arrangement of furnace will be acceptable to gas makers; but the present notion seems to be to make the most of the residuals and leave the gas to take care of itself.

HENRY GORE.

42, *Pentonville Road, London, N., May 28, 1878.*



A A. Air channels communicating with the outside air.
B B. Air channels with air heated.
C C. Slits or vents, 1 inch wide and 2½ inches deep, to convey heated air into furnace.
D D. Exhaust flues.

DEATH OF MR. W. H. WHIFFIN.—With unfeigned regret we announce the death, on the 30th ult., of Mr. William Harding Whiffin, Secretary of the West Middlesex Water-Works Company. Mr. Whiffin's health had been failing for some time, and he died at his residence, No. 12, Sandringham Gardens, Ealing, on Thursday last, of heart disease, aged 74. He had been in the service of the West Middlesex Company for the long period of 47 years, during nearly 25 of which he held the office of Chief Clerk and Secretary, having been appointed to succeed the late Mr. Knight at Christmas, 1853. He was most able and zealous in the discharge of his duties, was much esteemed by the Board of Directors, and was held in the highest respect by all who know him.

SEWAGE OF HERTFORD.—The Corporation of Hertford have placed their works for the purification of the sewage of that town in the hands of the Rivers Purification Association, who, for an annual subsidy of £350, undertake the whole management of the place, similarly to what they have done at Coventry, which place has been successfully worked for some time by the Rivers Purification Association under a subsidy from the Corporation of Coventry. Hertford is situated on the River Lea, from whence the New River Company derive their supply. The average daily flow of sewage amounts to about 1,640,000 gallons, the population being 7169. Water-closets are in general use, and the sewage, which is very dilute, in consequence of leakage of subsoil waters into the sewers, also contains refuse from breweries. By an Act passed in 1854 the New River Company obtained powers to lay down intercepting main sewers through the town, to construct works for treating the sewage by the lime process, and to convey the effluent water past the New River head into the Lea above the town of Ware. These sewage and outlet works cost the New River Company £28,000, and they pay the Corporation of Hertford £600 a year to purify the sewage. For 16 years, from 1858 until 1875, the lime process was used to purify the sewage at a working cost of £410 a year, and was then given up, as the Phosphate Sewage Company took a lease of the sewage works.

THE SAN PAULO GAS COMPANY, LIMITED.—At the meeting of Shareholders on the 14th ult., at the London offices of the Company, Pinners Hall, Great Winchester Street—Mr. Delmar in the chair—the Directors reported that from the 1st of July to Dec. 31, 1877, the total receipts for public and private lighting and rental of meters were £8591 8s. 6d., being an increase over the first six months of the year of £754 13s. 9d., thus showing a continually increasing revenue, which would have been even more favourable but for the low rate of exchange in Brazil. The net amount of revenue carried to credit of profit and loss account for the half year was £3014 8s. 6d., which added to the amount brought forward (£1212 3s. 8d.) after payment of the last dividend in October (£2148 12s.), made a total of £4226 12s. 2d. available for dividends and contingencies, out of which the Directors recommended a dividend to be paid for the six months up to Dec. 31, 1877, at the rate of 8 per cent. per annum, free of income-tax, amounting to £2864 16s., carrying forward the balance to credit of profit and loss, £1361 16s. 2d. The Directors state that the banking account of Mauá and Co. is yet unsettled, but as the three years delay granted by the Brazilian Government for the liquidation of the bank expired in May, the Board have every right to expect payment about that time. No further orders have been issued by the Government for the extension of public lighting, but a general desire of the inhabitants for this object is forcibly urged by the public journals of San Paulo, so it is inferred that this extension will soon be made. The private lighting is progressively extending. Mr. Gill, the Engineer of the works, reports that the machinery and buildings are in perfect order and repair, and the works are going on most satisfactorily.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, MAY 27.

The following Bills received the Royal Assent:—Lea Bridge District Gas; Lewes Gas; Marske and Saltburn Gas; Nottingham Water; Scarborough Water; Truro Water; York United Gas.

The Chairman of Committees informed the House that the opposition to the Cardiff Water Bill was withdrawn.

The Examiners reported that no further Standing Orders are applicable to the Cardiff Water Bill, Weston-super-Mare Improvement Commissioners Bill, and Radcliffe and Pilkington Gas Bill.

Southport Water Bill,—reported from the Select Committee, with amendments.

Gas and Water Orders Confirmation Bill, Local Government Provisional Orders (Droitwich, &c.) Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Bradford Water and Improvement Bill, Newbury Borough Extension Bill,—read a second time, and committed.

East Grinstead Gas and Water Bill, Hemel Hempsted District Gas Bill,—read the third time, with the amendments, and passed.

Manchester Corporation Water Bill.—A petition, in favour of dispensing with the Standing Orders not complied with in respect to this Bill, was presented from the Local Board of Hyde.

TUESDAY, MAY 28.

Bangor Local Board Bill,—reported.

Cheltenham Corporation Water Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Burton-upon-Trent Commissioners Bill.—Commons amendments considered, and agreed to.

Tredegar Water and Gas Bill,—read the third time, and passed.

Bradford Water and Improvement Bill,—referred to a Select Committee, consisting of Earl Devon (Chairman), Lord de Ros, Lord Lyttelton, Lord Clements, and Lord Gormanston; to meet on Friday, May 31.

Manchester Corporation Water Bill.—Petitions in respect to this Bill were presented, in favour of dispensing with the Standing Orders not complied with, from (1) Corporation of Oldham, (2) Local Board of Walton-le-Dale, (3) Trustees of the late Duke of Bridgewater, and of the late Earl of Ellesmere; and, in favour of, and praying to be heard against alterations, from Local Board of Walton-le-Dale.

PUBLIC HEALTH ACT (1875) AMENDMENT BILL.

The Earl of KIMBERLEY, in moving the second reading of this Bill, which has passed the Commons, said that the object of it was to enable Rural Sanitary Authorities to provide or require provision of a sufficient water supply. Where it appeared to the Rural Sanitary Authority that any house, within their district, had not such supply within a reasonable distance, and they were of opinion that such supply could be provided at a reasonable cost, not exceeding a capital sum, the interest on which, at 5 per cent. per annum, would amount to 2d. per week, or at such other cost as the Local Government Board might determine to be reasonable, they might call on the owner of the house to provide it, and, in case of his non-compliance, provide it themselves, and charge the expense to him. The Bill further provided that, in the case of all houses built after its passing, the Local Sanitary Authorities should have the power of withholding a certificate if there was not a sufficient water supply, and the effect would be to prevent the uncertificated house from being used as a habitation. He intended, in Committee, to propose an amendment extending the appeal given by the Bill to owners of existing houses against whom orders were made, to owners of houses to whom the Rural Sanitary Authorities refused certificates, and there would also be an appeal to Quarter Sessions against the decision of the Sanitary Authorities. The Bill only extended to water supply the principle embodied in existing Sanitary Acts with reference to the prevention of nuisances and overcrowding.

The Duke of RICHMOND and GORDON, while approving of the Bill generally, said he wished to guard himself against being supposed to agree in all its details. He thought that it would require amendment at the hands of a Select Committee, as there were points connected with the area of taxation which would have to be considered.

The Marquis of SALISBURY thought that some unexpected results might follow from imprudent legislation upon this subject; and, indeed, in some districts cottages might have to be pulled down. He knew a village which was upon the top of a hill, with some hundreds of feet of clay under it. The inhabitants had now to go some short distance to fetch water; but if the matter were placed in the hands of a fanciful Sanitary Authority, the result might be a considerable destruction of cottages. In many rural districts a water supply for cottage use was to be obtained only in one or other of two ways—either by sending to a distance for it, or by storing rain water. In the latter case cisterns must be erected, and this would make a considerable addition to the expense of cottages, which at present often cost a good deal more than could be derived from them. In many parts of the country there was a strong prejudice against the use of rain water for domestic purposes. It might be well, therefore, to have a declaration in the Bill that rain water was wholesome.

Earl FORTESCUE approved of the object of the Bill, which was that wholesome water should be brought within reasonable reach. A good deal of water might, however, be fit for various household purposes that was not fit for cooking or drinking, so that the terms of the Bill would require careful consideration in Committee. With proper amendment he believed the Act would be a useful one.

The Earl of KIMBERLEY said that there was this safeguard, that the Act was only to be brought into operation where it was practicable at a reasonable cost.

The Bill was then read a second time, and committed.

FRIDAY, MAY 31

The Examiners reported that the Standing Order applicable to the Gas and Water Orders Confirmation Bill, and the Local Government Provisional Orders (Droitwich, &c.) Bill has been complied with.

The following report from the Standing Orders Committee was agreed to:—That the Standing Orders not complied with in respect of the Manchester Corporation Water Bill ought not to be dispensed with.

Limerick Corporation Gas Bill.—Report from the Select Committee read, that the Committee had not proceeded with the consideration of the Bill, the opposition thereto having been withdrawn.

Hamilton Burgh Bill,—reported with amendments.

Cardiff Water Bill, Weston-super-Mare Improvement Commissioners Bill,—read a second time and committed.

Nottingham Improvement (Gas, &c.) Bill, Southport Water Bill,—read the third time, with the amendments, and passed.

Bournemouth Gas and Water Bill, Grand Junction Water Bill,—brought from the Commons, read the first time, and referred to the Examiners.

Bedlington Local Board Water Bill.—Commons amendment considered and agreed to.

Durham Water Bill.—The Chairman of Committees reported to the House that he was of opinion that this Bill should be proceeded with as an opposed Bill (under Standing Order No. 95), and that any parties who may petition on or before Friday, the 7th day of June next, to be heard against the Bill, should have leave to be heard by the Committee appointed to consider the Bill. This was agreed to, and the order made on the 9th of April was discharged, and the Bill referred to a Select Committee.

Radcliffe and Pilkington Gas Bill.—A petition against this Bill was presented from the Local Boards of Little Lever, Prestwich, Radcliffe, and Whitefield.

Manchester Corporation Water Bill.—The following petitions in respect to this Bill were presented:—In favour of dispensing with Standing Orders, from the Corporations of Wigan and Warrington, and the Local Boards of Tyldesley with Shakerley, Hindley, West Houghton, Atherton, Adlington, and Leigh; in favour of, and against alteration in, from the Corporation of Warrington, and the Local Boards of Adlington, West Houghton, and Leigh; and against, from Ratepayers of Manchester.

Public Health Act (1875) Amendment Bill.—The Earl de la Warr gave notice that, on the motion for the House to resolve itself into a Committee on this Bill, he will move that it be referred to a Select Committee.

HOUSE OF COMMONS.

MONDAY, MAY 27.

The Examiners reported that the Standing Orders not previously inquired into have been complied with in the case of the South Staffordshire Water Bill (Lords).

Dalton-in-Furness Local Board Bill, West Houghton Local Board Bill, South Hants Water Bill.—Lords amendments agreed to.

Burton-upon-Trent Commissioners Bill (Lords),—read the third time, and passed, with amendments.

Grand Junction Water Bill,—as amended, considered.

Leicester Corporation Bill (Lords), Lichfield Gas Bill (Lords),—read a second time, and committed.

Metropolis Water Supply Bill.—The order (Jan. 30) that the Metropolis Water Supply Bill be committed, was read and discharged, and the Bill withdrawn.

TUESDAY, MAY 28.

The Examiners reported that the Standing Orders not previously inquired into have been complied with in the case of the Exeter Corporation Water Bill (Lords).

Cockermouth and Workington Water Bill.—Lords amendments agreed to.

Cheltenham Corporation Water Bill,—read the third time, and passed.

Clitheroe Gas, Water, and Improvement Bill (Lords),—read the third time, and passed, with amendments.

Bournemouth Gas and Water Bill,—as amended, considered.

Newry Gas Bill (Lords),—read a second time, and committed.

WEDNESDAY, MAY 29.

Bedlington Local Board Water Bill (Lords),—read the third time, and passed, with an amendment.

Mansfield Commissioners Gas Bill (Lords),—read the first time, and referred to the Examiners.

THURSDAY, MAY 30.

Scarborough Corporation Water Bill.—Lords amendments agreed to.

Grand Junction Water Bill,—read the third time, and passed.

Drumcondra, Clonliffe, and Glasnevin Township Bill,—as amended, considered.

Public Health (Ireland) Bill,—considered in Committee of the whole House, reported, and recommitted.

FRIDAY, MAY 31.

East Grinstead Gas and Water Bill, Hemel Hempsted District Gas Bill.—Lords amendments agreed to.

Bournemouth Gas and Water Bill,—read the third time, and passed.

HOUSE OF COMMONS COMMITTEES.

FRIDAY, MAY 17.

(*Before Sir* JOSEPH BAILEY, *Chairman*; *Mr.* CHAMBERLAIN, *Mr.* MACIVER, *and Mr.* BLAKE; *Sir* JOHN DUCKWORTH, *Referee.*)

GRAND JUNCTION WATER BILL.

Sir EDMUND BECKETT, Q.C., and Mr. JOHN CLERK, Q.C., appeared for the Promoters; Mr. CRIPPS, Q.C., Mr. MICHAEL, Q.C., and Mr. O'HARA for the Metropolitan Board of Works, petitioners against the Bill.

Sir E. BECKETT, in stating the case for the promoters, said the Bill was a very simple one, and, in fact, there was no substantial opposition to the preamble, as the petition of the Metropolitan Board would be more satisfactorily dealt with on clauses. The object of the Bill was to enable the Company to raise further money, and to amend in certain respects their existing Acts. The preamble recited that, "Whereas by the Act of 1861 it was enacted that the limits within which the Company might supply water were by that Act extended so as to comprise the following parishes or places in addition to the Company's then district—*i.e.*, Chiswick, Acton, Isleworth, Twickenham, Hampton, Teddington, Hampton Court, Hampton Wick, Bushey Park, Whitton, and Hanworth, all in the county of Middlesex, provided that those limits should not comprise certain parts therein specified of the parishes of Isleworth and Ealing. And whereas it is expedient that the Company's limits of supply be extended so as to include the whole of the said parishes of Isleworth and Ealing, and the parishes of Hanwell and Heston, in the county of Middlesex." The corresponding clause in the Bill which extended the limits was the 4th, which provided that the whole of these parishes should be included. A certain amount of explanation might be given on this point. When the Bill of 1861 was in Parliament, there had been passed, only a year before, an Act authorizing the Colne Water Company to supply water to the district excepted, and it was alleged at that time, on behalf of the Colne Company, that the Grand Junction Company had not been active enough in extending their supply, the Grand Junction Company made excuses for not having done so, and it was submitted to Parliament that, if there was to be any security for the work being done, they should pass the Bill of the Colne Company, who would come into existence and carry out the obligation, or do it by arrangement with the Grand Junction Company. As the result of the passing of the Bill of the former Company, the second of the two courses was taken; the Colne Company made arrangements with the Grand Junction Company, who, no doubt, had *bonâ fide* intended to do the work, but had not been quick enough. The Colne Company, in consequence, passed out of existence, having sold themselves, in some way or other, to the Grand Junction Company, as most people expected they would. However, that had not come off in 1861, and it was only natural and usual that Parliament having given parts of those parishes to the Colne Company in the previous year, should exclude them from the Grand Junction Company's Bill. The necessity for the extension of the water supply by the latter Company had now become so great, that they were at present

supplying a district which they had no Parliamentary power to supply. In parts of this district the Sanitary Authorities were shutting up the wells, because they were polluted by sewage and other impurities, which made the water unfit to drink, and it was therefore necessary that good water should be forced on the inhabitants, even if they were not asking for it. However, they were asking for it, and he could hardly imagine that the Metropolitan Board would think of opposing the Bill on that ground, whatever else they might have to say. This, and things corresponding to it, were really all in the Bill that involved matters of principle. The Company required more capital, in order to extend their works, and they asked in the Bill for power to raise £300,000. The estimate for works immediately necessary was £260,000. They were continually called upon to extend their pipes, and therefore they provided a reasonable margin beyond immediate requirements—a very small margin, £40,000—which, *plus* the usual borrowing powers, would probably last them for 10 or 15 years. The necessity for the Bill was shown by the fact that Major Bolton, the Government Inspector, had recommended that certain works should be done by the Company, for preserving the purity of their water. In his report for the month of April, he said: "The construction by the Grand Junction Company of further impounding reservoirs, for subsidence at the intake at Hampton (so as to avoid the flood waters) is in contemplation, as the Company will require such reservoirs before they can deliver effectually filtered water during the period when floods prevail. The filter-beds require thoroughly cleansing and reconstructing, and the area thereof extending." These things would have to be done, and as land was expensive, the estimate for the purpose was not unreasonable. Major Bolton, in a further marginal note to his report, said: "Additional impounding and subsiding reservoirs are much required, to avoid taking in water when floods prevail. Daily samples were taken, and the water generally found to be clear and bright. The filter-beds require to be thoroughly cleansed, reconstructed, and extended." Upon that point there could be no doubt at all. The only thing, therefore, upon which it was necessary to trouble the Committee was the petition of the Metropolitan Board, which related to other topics than the real necessity for the Bill. The first paragraph of the petition that was of any consequence was the 4th, in which the Board said: "By the Bill it is proposed, amongst other things, to extend the limits within which the Company may supply water, and to authorize the Company to raise share capital to the amount of £300,000, in addition to the amount which they are authorized to raise by their existing Acts, and to borrow £75,000. Your petitioners object to the provisions proposed to be enacted by the said Bill, inasmuch as they submit that if the same were to pass into law they would be injuriously affected thereby in manner hereinafter set forth." When he (Sir E. Beckett) read that allegation, he tried to remember a single instance in which objections to the extension of the limits of a water company had been successful, and he could not remember one, because Parliament had always seen that companies ought to be in a condition to supply their districts with water. The Metropolitan Board then said "that the supply of water within the Metropolis by the Company at the present time is unsatisfactory." If so, that was rather a reason for passing the Bill. But in what way was it unsatisfactory? They said "as regards quantity, quality, and pressure." If so, would not the additional means of supplying a greater quantity of pure water, free from contamination, benefit the Metropolis in this respect? But the Board were wrong, for Major Bolton, in the report just referred to, said the water was excellent. No doubt the petition of the Board was presented by way of helping forward a couple of great schemes the Board had been promoting this year, and by the bringing in of which they were beginning to acquire, he was happy to see, an unpopularity they had long deserved. He (Sir E. Beckett) had had the luck to be always against them, and he knew perfectly well why this paragraph had been put into their petition. But the necessity for it no longer existed, because the Board had formally dropped one of their own Water Bills, and had substantially dropped the other.

Mr. Rees (Parliamentary Agent): They have given notice to drop the other.

Sir E. Beckett said the petition of the Board then stated that, "having regard to these facts, the Company should not be authorized to extend their limits of supply; or, if so authorized, that they should, by the Act giving them such authority (which they are not by the said Bill), be made subject to stringent and adequate provisions, having for their object to secure to the inhabitants of the Metropolis, residing within the limits of the Company's supply, a proper and sufficient supply of pure and wholesome water, for drinking and culinary purposes, constantly laid on, and also a sufficient supply of water constantly laid on at high pressure for the extinguishing of fires." The Board seemed to forget, or expected the Committee to forget, the great inquiry of 1871 into the water supply of the Metropolis, presided over by the present Speaker, when all these matters were overhauled most thoroughly. Then they said, "Your petitioners view with concern any extension of the Company's limits of supply, and submit that such extension will be prejudicial to the health and property of the inhabitants of the Metropolis now supplied by the Company, inasmuch as it will impose further duties and obligations on the Company, and thus render the Company even less able than they are at present to supply the wants of such inhabitants." Then they objected to any increase in the capital of the Company. How the limits were to be extended and the work done, which the Government Inspector said ought to be done, without an increase of capital, he was at a loss to know. But that which followed in the petition was, he supposed, the gist of the case. The Board "submit that, even if such additional capital be authorized, the same should not be raised as proposed by the said Bill, unless provision is made therein for the sale by auction, in the open market, of the shares or stock, by the issue of which such additional capital is proposed to be raised, and for the application towards the general purposes of the Company of any bonus or premiums that might be obtained by the sale of such shares or stock in manner aforesaid, and also for regulating the issue of such shares or stock, and making the same contingent upon the exercise of the borrowing powers contained in the said Bill." "They submit that it would be unjust not to make such provisions as aforesaid, as to the sale by auction of the new shares or stock of the Company, and the application of any premium or bonus thereon, and the regulation of the issue of such shares and stock as aforesaid; and they object to the said Bill, as, by reason of the absence therefrom of such provisions as aforesaid, any moneys obtained by way of bonus or premium on new additional share capital issued under the powers in the said Bill contained, would be paid over to the Shareholders of the Company, instead of being expended for the benefit of the Water Consumers." Then the petition proceeded to crave attention to the report of the Fire Brigade Committee of last session, in which, among other matters, that Committee recommended, "That the water supply now belonging to the various Companies should be consolidated in the hands of a Public Authority, which, in dealing with the question of constant supply, pressure, and pipeage, should be bound to have regard, not only to the wants of customers, but also to the requirements for the extinction of fires." But, after all, the main point of the petition was the prayer for the introduction of auction clauses into the Bill. Now, there was but little to be said about them. Parliament last year took occasion to consider the question of auction clauses, as regarded Gas Bills, and, for some reason of their own, they came to the conclusion that Gas Bills ought to have provisions of this kind introduced into them, unless the Committees to whom such Bills were referred should come to the conclusion that, for particular reasons, they should not be so inserted. The result was the adoption of a Standing Order for introducing into Gas Bills two things—first, a sliding scale of price and dividend—a thing invented by some Board of Trade conjuror; and, secondly, auction clauses. He (Sir E. Beckett) was not now discussing a Gas Bill, and therefore would not say anything about the operation of these clauses; but he might say this, that the consequence of the meddling of the Metropolitan Board with the London Gas Companies ever since 1860 had been to impose upon the Inhabitants of the Metropolis a burden which might be reckoned at at least a million a year, because it had resulted, in an indirect way, in nearly all the capital of the Companies being raised at a 10 per cent. dividend, instead of at a 7 per cent. dividend.

Mr. Cripps objected that this matter was irrelevant, and that it was undesirable to refer to it.

The Chairman said that Mr. Cripps would have the opportunity of making a speech afterwards.

Sir E. Beckett said, in reference to the Standing Order of last session, that Parliament, having the question of Gas Bills before them, and, of course, having in mind Water Bills also, thought proper, for their own reasons, to adopt these Orders in respect to Gas Bills, but not in respect of Water Bills. He was bound to assume that the Committee who framed the Standing Orders had good reason for this omission. There had never been such an Order in existence applicable to Water Bills, and there was no such practice in the matter; and inasmuch as the sliding scale did not apply to Water Bills (water being always charged for by rating), and inasmuch as the sliding scale could not be imported into a Water Bill, the auction clauses ought not to be. As to precedents for auction clauses in Water Bills, there were not many, and he could easily go through them. In 1854, the Nottingham Water Company were advised by some conjuror to propose to Parliament that they should sell their shares by auction, and there were people at that time who believed the Company were making a great mistake by so doing. However, the conjuror thought he knew better, and it was done, and whenever Nottingham had been in Parliament ever since, they had had this thrown in their teeth, so much so that they had had to submit to it again. What was said to them was this: "You volunteered it to Parliament in 1852; what right have you to complain if it is forced upon you now?" But there were other cases in which the attempt to insert auction clauses had been unsuccessful. It was attempted in Liverpool, at Sunderland, and at Chesterfield in recent times, and it had failed in all these cases. He spoke subject to correction, but he believed he was right in saying that Nottingham was the only case of a Water Company upon whom auction clauses had been forcibly imposed, and in that case they had existed before. A curious statement had been put into his hands relating to something which happened this year. The Standing Order to which he referred was an Order of the House of Commons, and was not binding on the House of Lords; and the fact he was about to state, though it related to a Gas Bill, was not irrelevant to the case now before the Committee. The Bill of the York Gas Company came before the House of Lords this year, the dividend on the new capital proposed to be raised being limited to 5 per cent. The auction clauses were inserted, and the Bill passed the other House. But when the Bill came before the Chairman of Committees in this House, seeing the limitation of the dividend to 5 per cent., he struck out the auction clauses, so that it could not be assumed, even with the Standing Order, that the Legislature always insisted upon their adoption. He (Sir E. Beckett) had known heaps of cases where they had been asked for in both houses, and in which they had not been inserted, and, therefore, it could not be taken, even with regard to gas, in which there was additional reason for it, that it was at all a standard parliamentary doctrine that these clauses should be inserted. Much less so was it in regard to water. Indeed, it was the contrary, for he found that attempts, and pretty strong attempts, were made, in the case he had mentioned, to induce the Chairman to waive his opinion, but it was useless. In that state of things he (Sir E. Beckett) would ask why the usual practice in this instance was to be departed from, and the general law altered. In 1863, when the Companies Clauses Act was passed, there was a repetition, in the provision in respect to raising new capital, of the practice which was sanctioned and enacted in the first general Act in 1845. The 17th section of the Act of 1863 provided expressly for the apportionment of new shares *pro ratâ* amongst existing Shareholders at par, if the ordinary share capital at the time was at a premium; but it was not obligatory upon the Company so to apportion them, unless the amount of each such share, when so apportioned, would be at least the sum prescribed in the special Act, or, if no sum was prescribed, then at least £10. The £10, however, had been altered by long practice, and both Houses had agreed upon the limitation of 10 per cent. being reduced to 7 per cent. in well-established Companies, for obvious reasons. It was well known that old Companies in good condition could always raise their money, if they were entitled to have a dividend of 7 per cent.—in some cases they had volunteered less. The Grand Junction Company had not been paying any very large dividend, and latterly it had been reduced for a temporary reason. As to part of it there had been some mistake as to what should be charged to capital, and what to revenue, and, therefore, he did not claim the benefit of that; but, independently of this fact, the dividends had been falling, for some reason, since 1871. If they were to raise the additional capital now asked for, the dividends would again fall for a time, though, of course, they would recover themselves, and people would take that into account in buying shares. He would ask whether there was any charge of misconduct in the petition against the Company? Was there any allegation that they had been victimizing the inhabitants of the Metropolis, or doing anything they ought not to have done, so as to justify a departure in their case from the general law? If all other Companies were allowed to issue their new capital amongst existing Shareholders, why not the Grand Junction Company? There had been cases in which Companies had been behaving ill—supplying bad water for example, but nothing of the sort was alleged here, and, therefore, he would simply rely upon the invariable practice—for, with the exception of Nottingham, it was invariable—and ask the Committee, when they had heard the evidence, to allow the Company to raise the money they required on the ordinary terms. He would add that, in case the Metropolitan Board were really going to impugn the character of the water supplied by the Company, he had not only Major Bolton's report to rely upon, but also the analysis supplied by the official analyzer of the Water Companies—Dr. Tidy.

Mr. Cripps: You need not trouble yourself about that.

Sir E. Beckett: That being so, I have said all that I have to say.

Tuesday, May 21.

Mr. *Alexander Fraser*, examined by Mr. Clerk.

I am a Member of the Institution of Civil Engineers, and am Engineer to the Grand Junction Water-Works Company. I have been 18 years in

the service of the Company. The whole of the Company's supply is taken from the Thames at Hampton. Their works there cover four or five acres of land. They have no filtering-beds there. There are two small receiving reservoirs between the engines which pump the water and the river. At Campden Hill they have three covered reservoirs, capable of holding 18 million gallons of water. These are about 130 feet above Ordnance datum. There is 12 feet 6 inches difference between that and Trinity high water. The water taken at Hampton is pumped for 7¼ miles to Kew Bridge, where it is filtered. It is proposed by the Company to make considerable additions to the filtering area there. At Hampton they have 32 acres of spare land, on which it is proposed to construct impounding reservoirs, so that they will be able to take in water from the river when it is not in a condition of flood—a course which has been strongly recommended by Major Bolton. This will place them in a better condition in reference to filtration. In future, there will be additional filtering-beds provided at Hampton. The cost of the impounding reservoirs there will be about £5000 per acre. It will take several years to effect all these works. In round numbers, the cost of the additional works at Hampton will be £170,000; at Kew, about £50,000; additional engines at the two places, £20,000, which, with the usual 10 per cent. for contingencies, brings up the total to £261,000, out of the £300,000 asked for in the Bill. Additional outlay will be required in a few years. By the Act of 1861 the Company were limited, with regard to the area of their supply, in parts of the parishes of Ealing and Isleworth, a Company having been formed in the previous year for supplying that district, which, practically, they have never done. We have been supplying those places as well as Hanwell, though beyond our parliamentary limits. We do not at present supply Heston; it is supplied by wells; but applications have been made to the Company to furnish a supply, and the district has been included in the Bill. For this purpose new capital is required.

Cross-examined by Mr. CRIPPS: I believe there are parties in the new districts ready to take water from the Company, so that we shall get a small return upon our outlay at once. The building of a superior class of houses at Ealing is proceeding. The expenditure of the £264,000, I have mentioned, might be spread over from seven to ten years, though much of the work for which it is required would have to be done soon.

Re-examined by Mr. CLERK: The impounding reservoirs at Hampton would have to be constructed at once. Their cost is estimated at about £160,000, which sum would be spent within three years.

Mr. *Ernest O. Coe*, examined by Mr. CLERK.

I am Secretary of the Grand Junction Water Company. It is the case, as stated in the preamble of the Bill, that the capital of the Company, under the Act of 1855, was £850,000; that further sums were raised under the Act of 1868; and that further sums are required for the general purposes of the undertaking. Fresh capital is required at the present time, and more will be necessary within a few years. It is proposed by the Bill to authorize the raising of £300,000 by shares in the ordinary way, the whole of which, no doubt, will be required.

Cross-examined by Mr. CRIPPS: The whole of our capital already authorized has been called up with the exception of £23,215. The present value of the £50 shares fully paid is £80 in the market. For the last two years we have paid dividends at the rate of 5 per cent. Before then we paid 7 per cent. The fall from 7 to 5 per cent. is a temporary matter, owing to our revenue having been surcharged for expenditure which had been placed to capital account. We unquestionably are looking for a larger dividend in the future. Between 1850 and 1873 the average dividend was over 8 per cent.; it was as high as 8½ at one time. In 1874 it dropped to 7 per cent., and subsequently to 5 per cent., for the special reason mentioned. I think the Grand Junction Water Company may be reckoned as a 7 per cent. investment at the present time. I do not look upon the Bill as likely to be a very great advantage to the Company, because of the new district it will give them. A large portion of the work to be done will be totally unprofitable—that of the purification of the water. It will be many years before the new districts pay satisfactorily. Assuming that the issue of new capital to existing Shareholders does not have the effect of lowering the dividends, the shares of £50 each will be worth £80 when fully paid up.

The CHAIRMAN: Do I understand you are going to issue these shares at par to your own Shareholders?

Witness: That is the power which we have under the Act of Parliament—when the old capital is at a premium the new shares are to be offered to existing Shareholders *pro rata* at par.

Mr. CRIPPS: If there were no clause inserted in the Bill such as we ask for, that would be the case; the Directors are bound to allot the new shares to the old Shareholders.

The CHAIRMAN: Is there any allegation that the Company spend money unnecessarily—waste money, in fact—with a view to have a colourable reason to ask for more capital?

Mr. CRIPPS: No, there is no allegation of that kind. Here is a general temptation to persons in their position, which we will deal with presently, but I have no reason to make any special allegation against this Company.

Cross-examination continued: It would be an advantage to the existing Shareholders to have the new capital allotted to them. The Company would get £300,000, and the Shareholders, if they sold their allotments, would, at the present market prices, get £180,000 beyond that.

Re-examined by Mr. CLERK: The Companies Clauses Amendment Act, 1863, provides for this disposition of the new shares; it is no special provision for this Company. In 1872 our dividend was 8 per cent., and in that year we issued fresh capital, which, the original shares being at a premium, was allotted to the Shareholders at par.

By the COMMITTEE: The cause of the last fall in the dividend to 5 per cent. was that certain sums of money had been allocated to capital which should have been placed to the debit of revenue, and the Government Auditor requires them to be replaced, so that our revenue charges are very heavy for two years. The cause of the previous fall to 7 per cent. was the heavy expenditure for coal, and the high price of iron and other things at that time. May I be allowed to make one remark? It has been stated that the Proprietors will necessarily gain a very large profit from the issue of new shares under the regulations at present existing in the Act of Parliament. But that depends upon whether the new shares are raised without limitation of dividend. If they are raised at a lower rate of dividend the same profit will not be derived by the Proprietors. Upon a large portion of the old capital, we can pay 10 per cent., but upon £140,000 we can only pay 7½ per cent. We have never paid our maximum dividend; we have never gone higher than 8½ per cent. Under the present Bill the maximum dividend on the new capital will be 7 per cent., but the Directors may determine to issue it at a lower rate, and in that case the price named will not be reached.

The CHAIRMAN: I understand that is only a hypothetical case. You do not say they do intend to raise it at a lower rate, but that they might?

Witness: They have not discussed the question how they shall raise it till they get the Act of Parliament, but I think it is a very probable case. We have raised portions of our capital hitherto upon this principle of limiting the dividend for four or five years, until the new capital is fully earning profit, and then allowing it the same rate as the old capital is receiving.

This was the case for the promoters, and the following evidence was given for the petitioners:—

Mr. *G. W. Stevenson*, examined by Mr. MICHAEL.

I am a Civil Engineer, and have had great experience in all matters relating to the supply of gas and water. During the last ten years I have been much employed by the Metropolitan Board of Works with respect to gas questions falling within their jurisdiction. I have read the Bill of the promoters, and the petition of the Board, in the present case, and have made myself acquainted with the condition of the Company, both as to the district they supply and the amount of capital they have invested in their undertaking. The value of their present £50 shares is £80, in the market—*i.e.*, at a premium of about 60 per cent. Supposing that the new capital of £300,000 proposed to be raised by this Bill had the same value in the market as the old capital, it would give a premium of £180,000 to the Shareholders, if allotted to them; but I do not suppose that it would have, as the dividend is limited to 7 per cent. If the new capital were offered for sale by auction, the public would be willing, no doubt, to invest money in it to pay them 5 per cent., and that would represent £140,000 upon the £300,000. There were a great number of Gas Companies throughout the country, even before the new Standing Order was passed, who were subject to the auction clauses. I have had experience as to how the public have estimated those shares by purchasing them in that way. The shares have always realized a considerable sum by way of premium, which premium has gone into capital without bearing dividend. I consider this has much inured to the benefit of the old Shareholders. If the Company are not paying maximum dividends, the effect of putting the premiums into capital enables the Company to get additional capital without increasing their burdens; it enables them to do a larger business, and to apply their profits from this increased business to the payment of larger dividends to existing Shareholders. Then it is obvious, looking at it in another way, that capital brought into a business, that does not carry any obligation with it—for instance, capital given to a man to put into his business—helps to insure the existing capital employed in that business—becomes, in fact, an insurance-fund. If the income of the Company goes on steadily increasing, as is the case with Water Companies, it enables a larger dividend to be earned when the maximum dividend has not been paid. If this new capital of £300,000 is sold by auction, I believe 40 per cent would be raised by way of premium upon it, amounting to £120,000, which would go into the concern instead of into the pockets of existing Shareholders directly, and would thus hasten the time when 10 per cent. would be paid on their present investment. It is of importance to the consumers that there should be economy in the raising of capital, as under the Water-Works Clauses Act, 1847, the Company are under no obligation to reduce their water-rates till the Proprietors get 10 per cent.

Mr. MICHAEL: What is your experience of the auction clauses, as tending to economy in the expenditure of capital?

Witness: The introduction of the auction clauses, in respect to new capital, takes away from a Company any inducement to issue new capital; they will issue it only when absolutely required for capital purposes.

Mr. MICHAEL: Do you think generally that their application to Gas Companies has been beneficial?

Witness: I am sure it has.

Examination continued: At present there is a Standing Order, by which, except under circumstances which satisfy the Committee that they ought not to apply, auction clauses are inserted in every Bill for raising new capital for gas purposes. The Standing Order does not apply to Water Companies. Auction clauses have been inserted this year in the Bill of the Nottingham Water Company. They had previously been in operation in the case of that Company from 1852 up to 1874. I do not see any good reason why auction clauses should not apply to Water as well as Gas Companies. On the contrary, I think the capital of a Water Company should be raised more moderately, if possible, and expended more economically than that of a Gas Company, because water is a necessary of life and a sanitary agent, and people ought to get it as cheaply as possible, whereas they can afford to pay for gas, and can use gas or not as they please. Water Companies have advantages, too, which Gas Companies have not. They make their charge for water by a rate upon the annual value of the property supplied, and the annual value of house property in this country increases rapidly from year to year. That is specially the case in the Metropolitan area, in which a re-assessment of the value of property is made every five years. I know in this Company's district it has been very largely increased, and, in some cases, they have taken advantage of the circumstance to advance the water-rate. They might do so at any time with regard to the whole of the property. In the acquirement of their undertaking by any Sanitary Authority for public purposes, it would have to be taken commensurately with the amount of capital which has been raised, and the profit earned upon it. There is, therefore, a double reason why Local Authorities should be very watchful as to expenditure of capital by these Companies, as they will in future, if they acquire the undertakings, have to pay for the whole of the profits earned by the Companies, and this £120,000 would eventually be the sum which would come out of the pockets of the ratepayers.

Cross-examined by Mr. CLERK: The provision of the Act of 1863 with reference to the allotment of new capital to existing Shareholders is a general law, which has been very frequently repealed or amended in regard to Gas Companies. The Standing Orders now require auction clauses to be inserted, unless the Committee otherwise decide, for some special reason.

Mr. CLERK: Those auction clauses are coupled with the sliding scale, which enables Gas Companies to raise their dividend beyond the ordinary rate, supposing they reduce the price of gas below the standard?

Witness: The Standing Orders make it obligatory upon a Committee to insert the auction clauses with regard to new capital, unless they decide otherwise, and state their reason for so deciding; but the insertion of the sliding scale of dividend and price is not obligatory—it is optional. It may be that the two provisions are generally inserted concurrently; but there are notable exceptions.

Cross-examination continued: The auction clause which governed the Nottingham Water Company, in the raising of capital from 1852 to 1874, was inserted by them voluntarily. I knew that, but did not tell the Committee, as I was not asked. The Company needed capital very much, and they inserted the clause. They chose to increase their available capital by offering their shares at public auction, and applying the premiums so received to capital purposes. In 1874, when they came to Parliament for further capital, they declined to insert the clause in their Bill. It was pressed upon them by the Local Authority, but Parliament refused to insert it. They, therefore, obtained their new capital under the provisions of the Companies Clauses Act of 1863. It was stated to the Committee at the time, that the capital then asked for would last them for ten years, whereas they have had to come again this session, when only four years have passed, for more. The Corporation of Nottingham also promoted a Bill this session for the compulsory acquisition of the Water Company's undertaking, and by petition they opposed the Water Company's Bill,

and asked Parliament to insert the auction clauses in respect of the new capital. I do not know that it resulted in a compromise, but I know the Corporation Bill was thrown out, and auction clauses were inserted in the Bill of the Company.

Re-examined by Mr. MICHAEL: The decision of the Committee on the Nottingham Bills was this: "The Committee find that the preamble of the Nottingham Water Bill is proved. The Committee direct that the auction clauses shall be inserted, and that the capital shall be reduced to £100,000, with the usual borrowing powers of £25,000. The Committee also find that the preamble of the Nottingham Improvement, Gas, and Water Bill is proved, all reference to the purchase of the Nottingham Water Company being struck out." There was nothing said about a compromise, so far as I remember.

By the COMMITTEE: I look upon the effect of the auction clauses in this case as being absolutely to take away all inducement to spend money unnecessarily, and to hasten the time when the existing Shareholders will get their 10 per cent. dividend. I do not think that the effect will also be to take away the inducement to spend money unnecessarily. The pressure put upon Water Companies in the Metropolis and elsewhere by the Local Authorities is such that they must spend the necessary amount of money to obtain a good supply of water for their districts. Especially is that the case in the Metropolis, where reports are furnished to the Local Government Board every month.

Mr. CRIPPS was then heard in support of the petition of the Metropolitan Board against the Bill. He said he had no other witness that he desired to call, because, whatever his case might be, it was far better, he thought, where there was one clear decisive point, to bring the matter at once to that point, without troubling the Committee with other matters to which the Metropolitan Board of Works attached no very great importance. No doubt the Committee were aware—indeed, it was stated by Sir E. Beckett—that in the present session two Bills were introduced by the Metropolitan Board of Works, whom he now represented, which would have given them power to purchase the existing Water Companies, and thenceforward the supply to London would have been in their hands. Sir E. Beckett was right in stating that those Bills were brought in; he was wrong in stating that they were withdrawn; that was to say, they remained in the Orders of the day for a considerable time, and, though one passed the second reading, it became, after a certain time of the session, quite hopeless that they could have been got through the House of Commons in time enough to be considered by a Committee of the other House, and the consequence was they were withdrawn for the present session. But that withdrawal did not in the least degree (if anybody had seen the proceedings of the Metropolitan Board of Works they would see that this was so) alter the desire of the Metropolitan Board for what they thought was right to be done with reference to the water supply in the Metropolis; or indicate what would be attempted again in the next session in the matter. He would say just one word, before coming to the general question of the auction clauses, as to what would be the effect upon the Metropolitan Board, and the consumers whom the Board represented, of passing a Bill of this kind without those clauses being inserted. Of course, the Water Companies might hereafter have to be bought by the Metropolitan Board, and they would be bought, as all such undertakings were bought, with reference to their probable future value. Whatever they had been in the past was unimportant, except so far as it threw light upon the future value. Whatever the Shareholders of the day might have put in their pocket would be no part whatever of the consideration for the future. Now, supposing this Company were to get power by this Bill to raise new capital in the way in which they proposed to raise it—*i.e.*, by allotment among the existing Shareholders—the money which would be raised for the benefit of the Company was £300,000, and what the Metropolitan Board would have to pay for, and to take into consideration in the future value of the Company, was, so far as the new capital was concerned, £300,000; yet, in the interval between now and the time when that could be carried out, and the Metropolitan Board of Works could be the purchasers, the present Shareholders of the Company might have put into their pockets about £180,000. He could not state the total amount very exactly; the amount could not be ascertained with any very great accuracy, because it depended upon the opinion of purchasers as to the value of the shares of the new capital; but, whatever it was, there would have been that enormous amount added, which would be a permanent charge upon the revenue for the future, and would not be in the least an advantage to those who would purchase the undertaking, but would have gone into the pockets of the old Shareholders. On the other hand, if the new Shares were to be sold in the market, supposing the Company wanted £300,000, and the market value of the shares was cent. per cent., they would issue merely £150,000, for which they would receive the full amount required, and for the future would have to pay dividends on only half that amount. If the capital was to be allotted, as asked, the full £300,000 must be issued, and at a future time, when the Metropolitan Board, as representing the consumers, became the purchasers of the undertaking, they would have to pay the difference between the amount of capital which alone need have been raised, and the sum actually issued by the Company.

The CHAIRMAN: Does the sum that you would pay depend upon the amount of capital or upon the amount of money earned?

Mr. CRIPPS said the earnings of the Company were required to pay so much dividend upon capital. If the capital was excessive, of course that was one of the charges, just as much as any other expense, on one side of the accounts; and, therefore, the clear profit at the end was so much less in consequence of the heavier charge for capital. He would now pass from the effect it would have in that particular instance, because he did not think he was entitled, the Bills promoted by the Metropolitan Board having been withdrawn for this session, to put them forward at all further than he had done. He would state the general effect of the powers to raise money in the way it was proposed to be raised by this Bill. Of course, it was known that in Companies of this kind they could not divide more than 10 per cent.; that was the old limit for some time fixed by law, and when the Company arrived at that degree of prosperity which enabled them to divide 10 per cent., everything over and above that went, not into the pockets of the Shareholders, but to reduce the price to the consumers, whether gas, or water, or whatever it was. The consumers, therefore, after 10 per cent., had all the interest in the prosperity of the Company. Up to 10 per cent. it was entirely a Shareholders question; after 10 per cent. it became the property of those whom the Company were supplying. To take the case of the Gas Companies who had been most prominent hitherto, because most prosperous, in which 10 per cent. had been easily reached, consumers might expect an almost immediate reduction of price, because the Companies were under the obligation, after dividing 10 per cent., to lessen the price—indeed, they had nothing else to do with the money. In that state of the law there was passed the Companies Clauses Act of 1863, and no doubt when it was passed, the effect it would have, in giving to existing Shareholders in a Company the allotment of new capital in proportion to their holdings, was not seen. It was an Act probably obtained by the Companies themselves; at any rate, it was a matter extremely convenient for the Companies to have it so. It was soon found, however, that it offered a great inducement to the Companies to be extravagant. Of course, with a Company having their own superintendence and control (the consumers only being interested when the concern rose to a particular point of prosperity) it was very difficult to check all the different expenses which might be indulged in. The Shareholders had no interest, even if they received 10 per cent., in making matters more prosperous, and, therefore, if they chose to vote large sums to their Chairman, Directors, and Secretary, and all their other officers, and to conduct their business in an extravagant way, there was really nobody to interfere with them. The difficulty, therefore, was to invent something by which the Companies should have a real interest in being as economical as possible. That something had been invented in the case of Gas Companies by the sliding scale, which gave them the power of dividing more than 10 per cent. if they charged their consumers less than a certain sum; in other words, the more economically they carried on their business, the better it was for them, because they did not stop at the dead level of 10 per cent. The difficulty, as he had stated, always had been, with Water Companies, and every other kind of Company, to devise some machinery by which they could be induced to carry on their business as economically and carefully as an ordinary tradesman would do; because, of course, with a 10 per cent. limit, they had not that ordinary inducement to carry on their business carefully which every man had in his own private concern. Soon after the Act of 1863 was passed, it was seen that its effect was directly opposed to what Parliament were desiring to do with all Companies; instead of its being an inducement to them to conduct their business economically, like any other tradesman, it was a direct inducement for them to conduct it extravagantly and badly, because it was better for the existing Shareholders that it should be so. It did not require very much to show that that was so with new capital allotted to the existing Shareholders. For example, say the shares were of such a value that they realized cent. per cent. premium. The Company might have been able to go on very well, but finding their profits were increasing they would say, "Now, if we can get power to raise £500,000 more capital, it will have to be allotted among the Shareholders; and to our Shareholders that £500,000 will be worth £1,000,000, because, inasmuch as the public will give them £100 for every £50 the moment the £50 is allotted, each Shareholder can take his £50 to his broker on the Stock Exchange, and will receive back what is equivalent to £100." Now, it was obvious that this was an inducement to extravagance. When he was asked if he charged extravagance against the Grand Junction Water Company, he said he did not do so in any way, but Companies were no better than individuals in any case, and if temptation was set before them, and a scheme was in existence by which they could decidedly benefit themselves quite within the law, it was difficult to say that that inducement would not, in some way or other, have its operation. He did not mean to say that people were so corrupt that they would, for the sole purpose of raising new capital, pretend a want; but there were a hundred ways in which the thing occurred. The Secretary, or some one, suggested: "You want a new gasholder here; you want a new filter-bed; you want to build great towers here, and a water-tower there," and matters of that kind. Supposing he (Mr. Cripps) was a tradesman who felt that that outlay of capital would be a risk, he would take very good care to be informed of its necessity first of all; but if he was a Director of a Company and felt that the outlay would be, at any rate, a direct interest to him and the Shareholders whom he represented, in putting money into their pockets, he could not but think that he should not be different from the rest of the world if he did not inquire too closely into the actual necessities. He believed the Chairman or Director of a Company was Chairman or Director for the Shareholders as well as for the public, and he did not know, if he found that the thing could be done within the law, he was to look at the interests of the public and disregard the interests of the Shareholders, who trusted to him to represent them. It was quite clear, therefore, that the best thing he could do would be not to inquire too closely about the new expenditure, but go for a Bill for it, and get power to raise the necessary capital. This matter was thoroughly considered and discussed, and as soon as it was pointed out it became almost too evident to contradict at all, and the Legislature, therefore, in a great number of separate instances, sanctioned clauses being put into Bills which exempted them from the operation of the Act of 1863, and directed that the new capital should not be raised by being allotted to the Shareholders, but by auction. A great many Gas Bills had been passed with the auction clauses inserted, and Mr. Michael had prepared a list of Companies in whose Bills, when they applied to Parliament, auction clauses were inserted prior to the time when there was any Standing Order on the subject. These amounted to 26.

Mr. CLERK: All were Gas Bills.

Mr. CRIPPS: Gas Bills, with the exception which he would presently refer to; so that there was no Standing Order made in the first instance with reference to Gas Bills, upon the general view of the policy of the matter; but Parliament, in a number of individual cases, inserted clauses where they thought the circumstances of the case required it; and then, after a great number had been inserted, a general Order was passed, which applied it to all future Bills. The policy of doing it, therefore, did not originate with Parliament—they merely passed the Standing Order—but in different Committees, sitting on different Bills, and in different circumstances, thinking that, in the particular case before them, it was right and proper and best that it should be done. These Bills amounted to 26 in number, so that it was quite a mistake to say that the insertion of auction clauses in Bills depended on the recent Standing Order. That Order rather arose out of Committees so frequently having thought that, in the Bills before them, it was desirable that auction clauses should be introduced. That being so, two years ago the House, after a debate, applied the principle of auction clauses to Gas Bills generally, and there was no difference in principle between the case of gas and water. Mr. Stevenson made a distinction in saying that water was a greater necessary of life than gas. He did not know there was much in that; they were both necessaries, but the reason why it was applied in the case of gas so generally was that Gas Companies were usually more prosperous than Water Companies, and that the dividends paid by the greater number of Water Companies were very much less upon the average than those paid by Gas Companies, and, therefore, cases had not occurred before Committees, in the case of Water Bills, so frequently as they had in the case of Gas Bills, where the circumstances rendered it desirable for the auction clauses to be inserted. Mr. Stevenson said that the result of the insertion of auction clauses, in reference to the case of gas, had been a very great boon to the consumers, and of course it would be so. First of all there was taken away from the Companies one very great inducement to be extravagant with regard to their capital, and that was the first thing that was desirable. The next was that the capital introduced into the concern was obtained at a much cheaper rate than the old capital, because if the old was paying 7, 8, or 10 per cent., or whatever it might be, and the new was raised by auction, say, at the rate of 4 per cent., of course all that cheaper capital was mixed up with the old, and assuming it to produce, when applied for the purposes of the undertaking, the same amount of revenue that the old capital did, it was obviously a very great boon to the old capital even, because it made the dividend upon it more secure than it was before,

inasmuch as the new capital introduced was a less charge upon the revenue than the old was. One member of the Committee had asked if the taking away of the power to allot new shares to the old Shareholders would not also remove all inducement to Companies going on expending money which was necessary to be expended. He might suggest an answer to that in a general way. Clearly it would not, because it was for the benefit of the old Shareholders that the concern should go on with cheaper capital than it otherwise would. Supposing he (Mr. Cripps) was dividing 8 per cent., and he wanted to continue at that rate, whether he introduced new capital upon which 10 per cent. was the charge, or capital for the same purpose at 5 per cent., was a very different thing as regarded the security of his 8 per cent. upon the old. His 8 per cent. upon the old was much more safe if a portion of the capital which earned that rate had been raised at 5 than if it had been raised at 10 per cent. Quite independently of the interest he had in getting an extra sum for the new capital if he took it into the market, the security of what he was getting for the old capital was increased. But there was another matter which was probably a still greater inducement. No Company carrying on any business desired to have another Company coming in supplying close alongside if they could do the work themselves, and it was very much better for the old Company, if they saw an opening, to appropriate it themselves, than to allow any other Company to come in whose prices might be less than theirs. In almost all Companies of this kind, there was a monopoly so long as they continued to supply consumers; but if they did not, the consumers had a right to go elsewhere, and a new Company would start. Therefore, quite independently of the benefit derived by the sale of shares on the Stock Exchange, there was quite sufficient inducement to ensure that the Company would go on with their business, and do what was required, without the necessity of allotting this money among their Shareholders. But they would only do what was required, the inducement not being sufficiently great for them to do what was extravagant and not required, though ample to induce everything to be done that would be right and proper. That being the operation of the auction clauses, he was quite surprised that Sir Edmund Beckett should so far have misunderstood them as he did in his opening speech. It was perfectly true that the capital of the Metropolitan Gas Companies was raised at 10 per cent., but the man who bought at 10 per cent. gave £200 for it, and therefore when it came to the Company it was only raised at a 5 per cent. dividend. If it were raised by the Company, it might be raised at 10 or 7 per cent., and the charge upon the business of the Company thenceforward would be a charge of so much capital at 10 or 7 per cent. If it were raised by auction, the ultimate purchaser might pay 10 per cent., but the charge upon the Company's revenue for the future was only 5 per cent.; that was to say, if sold by auction, every purchaser would give £200 for £100, and that £200 went to the Company, and as he gave £200, it was quite clear he had only to be paid 5 per cent. On the other hand, if it was allotted to the Shareholders, and he obtained 10 per cent. capital, and sold it for what he could get, the difference between the 5 per cent. and 10 per cent. went into his pockets, and was no longer heard of. Every £100 sold in that way remained a charge of £10 annually on the Company; if sold by auction, it remained a charge of £5 annually. He (Mr. Cripps) felt somewhat angry when Sir Edmund Beckett so utterly misunderstood the effect of the auction clauses and sliding scale. He was quite aware how advocacy led one away from seeing both sides of a question; but it was strange that Sir Edmund should have viewed the legislation since 1860, in reference to the gas supply of the Metropolis, as resulting in a charge to the public of an extra million a year, because it had caused all the capital of the Companies to be raised at a 10 per cent. dividend, instead of 5 per cent. It was that the £200 was raised at £10; not that the £100 was. In relation to this particular case, there was one point to be considered. If this were a Company whose shares were only selling on the Stock Exchange, and were worth very little, of course, the Bill would be unimportant; but the circumstances had to be looked to. At this moment their £50 shares were selling at £80, and the consequence was that the moment the new capital was allotted, it would bear a very considerable premium. Every Shareholder to whom it was allotted could go at once into the market, and realize some premium on his allotment. It was not, perhaps, possible to make an exact calculation of figures, because the old capital might have gone up as high as 10 per cent., and the new capital could go as high as 7 per cent. He did not know how far that might affect the selling value, because probably the holder of old £50 shares, now worth £80, did not expect to get 10 per cent. very quickly. And so upon the new capital, the purchaser would look for some increase up to 7 per cent., which, of course, would be attainable much sooner than the dividend of 10 per cent. How that calculation might work out was not material. What was material was that, whatever the figure might be, there was to those shares a very large value in the market which the Shareholders had no right whatever to appropriate. The present Shareholders went into the concern as the successors of the original holders, who ran a considerable risk in establishing a new business, and, probably, for some years had no dividend at all. The new capital was subject to no such risks; the concern was established, and it was perfectly well known what it would pay. It might be quite fair at the outset to give the Shareholders the chance of paying 10 or 7 per cent., if they could make it, but that did not apply at the present moment. It was purely a bonus which Parliament were asked to give them in respect of this new capital, that it should be appropriated amongst them. Had they given any reasons for it? They relied on the Companies Clauses Act, of 1863; but that was an Act which applied generally, and had been infringed completely in a number of individual cases, and was entirely set aside, by the Standing Orders of the House of Commons, in the case of Gas Bills. It had also been set aside this session, in the case of the Nottingham Water Bill, in which auction clauses had been imposed. This Committee were not, therefore, being asked to set a precedent for departing from the Act of 1863; it had been done over and over again in cases where Companies were in a thriving condition, showing that, in the opinion of the Legislature, they ought now to be regarding the interests of the consumers, and not looking entirely to themselves. Whatever profit the auction clauses might be to the Company, they were entitled to until they reached 10 per cent.; but, when they reached that point, these clauses would tend to the benefit of the consumers. In the first instance, seeing the Company were not now paying maximum dividends, the clauses must inure to the benefit of the Company, because, the capital being thus raised at a cheaper rate, it accelerated the time when the Company would reach their maximum dividends. On the other hand, if this new capital was to be raised by allotting the shares amongst existing Shareholders, the benefit to the Company, as such, was entirely lost. In conclusion, the learned Counsel remarked that his clients, the Metropolitan Board of Works, believed that they were on the eve of becoming the purchasers of the London Water Companies. Probably the Companies themselves did not admit that point of view, and he was quite aware that they would struggle against it, and it would have to be fought out for some weeks in an ensuing session; but the Board thought that nothing ought to be done to disturb what might be called the present prospective value of the undertakings. He thought, moreover, that it would be for the ultimate benefit of the Consumer and of Shareholder, that whatever advantage could be derived from the introduction of auction clauses into this Bill should be secured for whoever might be entitled to it in the future.

Mr. CLERK replied. He said the question of the application of the Act of 1863, with reference to the appropriation of new capital, was not one that had a special application to the Metropolis, but affected the whole of the kingdom. If the principle was bad for London, it was bad for the Country at large. There had been, since the passing of that Act, several general Acts affecting Companies, but no attempt had been made by any one of them to amend this provision. What, then, were the special circumstances which should induce the Metropolitan Board to ask the Committee on the present Bill to depart from the general law on this matter. As a matter of fact, auction clauses had no application to Water Companies. The case of the Nottingham Company was so special that it must at once be laid aside, and not exalted into a precedent. There was no Water Act in existence, except that of Nottingham, in which such clauses existed. It had been, in years gone by, attempted to introduce them at Liverpool, Sunderland, and Chesterfield, and in each of these cases Parliament rejected them. The argument of his learned friend in favour of such legislation was that, if these clauses were not introduced in the present Bill, the Company would act improvidently in raising new capital, and would expend money unnecessarily in order that existing Shareholders might pocket the advantage which the premium attaching to the new shares would give them. Mr. Cripps did not allege that there would be an actual fraud on their part, but he alleged that they would pretend a want; that there would be inducements to extravagance. Now he (Mr. Clerk) believed that this was a most absurd proposition. The very fact that persons were in possession and management of a profitable and well-paying concern, would induce them to take care that, in the future, money should not be so expended as to produce a less return than they had made in the past; because not only would the new shares suffer by any extravagance in raising and expending money, but the old shares would be subjected to a diminution of dividend. As far as the Metropolitan Board were concerned that which they had to consider was, not what was the nominal capital of the Company so much as what were the profits of the Company, and what was the dividend they were paying. In truth, the Committee were asked to deprive the Grand Junction Company of the privilege to which, by the general law of the land, they were entitled, simply because the Metropolitan Board hoped, at some future time, to purchase the undertaking at a lower price than they otherwise could do. He (Mr. Clerk) ventured to submit that the Committee would require some more valid reason than that before they inserted a clause in this Bill, at variance with the general law of the country.

The room was then cleared, and on the parties being again admitted,

The CHAIRMAN said: The Committee are of opinion that the preamble of the Bill is proved, subject to the insertion of the auction clauses. They wish for further evidence as to the amount of capital required. The amount that is proved for is £240,000, or with contingencies £264,000; the amount asked for in the Bill is £300,000, with borrowing powers of £75,000 more. The auction clauses also being inserted would raise the real value of this capital considerably beyond that sum.

Mr. CLERK: It might; it may have the effect of depreciating the value of the shares.

Mr. MICHAEL: I may say, sir, that as far as the Metropolitan Board of Works are concerned, they have no objection to the capital which is asked for on the part of the promoters; as, the auction clauses being inserted, we have a protection against the undue expenditure of capital, and we have no objection to the Company taking those powers.

Mr. CLERK: A margin is always allowed beyond immediate requirements. A few years in advance are always allowed in these cases, because you can never tell what the demands may be.

The CHAIRMAN: I think the Committee are of opinion that they are content to leave the capital as it is under those circumstances.

Mr. MICHAEL: We have prepared clauses, which experience has shown to be desirable in the working of the auction clauses, and which have been inserted in every Bill which has passed. I will hand them to my learned friend.

[They were as follows:—"Clause 8*a*. (New shares to be offered by auction or tender.) Notwithstanding anything in this Act contained, the Company shall, when any shares or stock created under the powers of this Act are to be issued, and before offering the same to the holder of any other shares or stock in the Company, and whether the ordinary shares or ordinary stock of the Company are or is at a premium or not, offer the same for sale by public auction or by tender, in such manner, at such times, and subject to such conditions of sale as the Company shall from time to time determine. Provided that at any such sale the reserved price put upon such shares or stock shall not be less than the nominal amount thereof, and notice of the amount of such reserved price shall be sent by the Company in a sealed letter to the Board of Trade not less than 24 hours before the day of auction, or the last day for the reception of tenders, as the case may be; and such letter may be opened after such day of auction or last day for the reception of tenders, and not sooner; and provided that no priority of tender shall be allowed to any holder of shares or stocks in the Company."

"Clause 8 *b*. (Purchase money of capital sold by auction to be paid within six months.) It shall be one of the conditions of any sale of shares or stock under this Act, that the whole nominal amount thereof, together with any premiums given by any purchaser at such sale, shall be paid to the Company within three months after such sale."

"Clause 8 *c*. (As to the notice to be given as to sale, &c., of shares.) The intention to sell any such shares or stock by auction or by tender shall be communicated to the Clerk of the Metropolitan Board of Works, and to the Secretary of the Committee of the London Stock Exchange, at least 28 days before the day of auction, or the last day for the reception of tenders, as the case may be, and notice of such intention shall be duly advertised four times during such period in two or more London daily newspapers."

"Clause 8 *d*. (Shares not sold by auction or tender to be offered to Shareholders.) When any shares or stock created under the powers of this Act have been offered for sale by auction or tender, and not sold, the same shall be offered, at the reserved price put upon the same respectively for the purpose of sale by auction or tender, to the holder of ordinary shares or ordinary stock in the Company, in manner provided by the Companies Clauses Act 1863. Provided always that any shares or stock so offered and not accepted within the time prescribed by the said Act shall again be offered for sale by public auction or by tender, in the manner and subject to the provisions of this Act with respect to the sale of shares and stock created under the power of this Act."

"Clause 8 *e*. (Application of premium arising on issue of shares or stock.) Any sum of money which shall arise from the issue of any shares or stock by way of premium, after deducting therefrom the expenses of and incident to such issue, shall not be considered as profits of the Company, but shall be expended in extending and improving the works of the Company, or in paying off money borrowed or owing on mortgage by the Company, and shall not be considered as part of the capital of the Company entitled to dividend."]

Those are the clauses we propose, which are the ordinary clauses inserted in every Act.

Mr. BLAKE: Do the Metropolitan Board of Works require notice? Is there any precedent for that?

Mr. MICHAEL: It is always given to the Local Authority. We have actually followed, word for word, the precedent.

The clauses of the Bill were then proceeded with.

Sir JOHN DUCKWORTH: Is there anything to say on the question of the form of the auction clauses?

Mr. REES: We do not criticize on the point of form. The Committee have decided the principle, and the form is the common form of clauses. The Referee will know what I mean.

The clauses were read through and settled, and the Chairman was directed to report the Bill, as amended, to the House.

THURSDAY, MARCH 21.

(Before Mr. J. HOLMS, Chairman; Mr. W. G. CARTWRIGHT, Mr. BARNE, and Mr. BOWEN; Mr. BONHAM-CARTER, Referee.)

NOTTINGHAM WATER BILL.

NOTTINGHAM IMPROVEMENT, GAS, AND WATER BILL.

(Continued from p. 837.)

Mr. *Weston*, a Mining Engineer of Eastwood, and a member of the deputation of the inhabitants of that place which waited upon the Directors of the Water Company in September last, deposed to the wants of the district, and the desire for the Company's service there.

Mr. *William Fold*, examined by Mr. POPE.

I am a Civil Engineer, and have had large experience in questions of water supply. I have frequently had occasion to investigate the water supply of Nottingham, and have lately visited the town to examine the works with a view to this application to Parliament. Formerly the water for Nottingham was obtained from the River Trent, but that supply has now been discontinued. The engines and the whole of the apparatus are there still, but they have not been used for some years. There was a general feeling in the town against the river supply, and there were better sources of supply available. The chief supply at the present time is from wells in the new red sandstone. This supply is ample in quantity and good in quality. Water is obtained from the Scotholme Springs, and brought down in a pipe to the Castle pumping-station, where it is pumped into a reservoir in Park Row, and distributed over the lower part of the town. The quantity supplied from this source during 1877 was in round numbers 70,000 gallons per diem. The capacity of these springs, as given to me by an officer of the Company, is 428,000 gallons per day. That has reference to the yield of the springs and to the power of the pumps. The Castle pumping station, supplied from the Scotholme reservoir, will give an average of 428,000 gallons. In point of fact, it distributed 70,000 gallons last year. The next source is the Park pumping-station; that is capable of yielding 720,000 gallons per diem; the quantity actually taken during 1877 was, on an average, about 280,000 gallons per diem. The water from that source is pumped into a reservoir called the Belle Vue service reservoir. The next source is Basford, where there are five engines capable of pumping 3,300,000 gallons per diem. The quantity supplied from that source in 1877 was 1,409,000 gallons per diem. Lastly, there is the service at Bestwood Park, capable of supplying 4,400,000 gallons per diem. The quantity actually supplied during 1877 was 1,310,000 gallons. The totals of these capacities are 8,848,000 gallons per diem; the actual quantity pumped during 1877, 3,069,000 gallons per diem. I omitted to say that the Basford station has the power of pumping into the Belle Vue and Mapperley reservoirs. The Bestwood station pumps into another reservoir called the Red Hill reservoir, from which the water descends by its own gravity to the Belle Vue reservoir and the Park reservoir. The supply of the town of Nottingham is divided into three zones. The Park reservoir was the first to be constructed to supply the lower zone of the town. As the population increased on a higher level, it was necessary to establish another reservoir, and this was done by forming that of Belle Vue, which supplies the middle zone. Another reservoir was established, as the town further increased, to supply the higher zone, and this was constructed at Mapperley. Therefore we have the Mapperley reservoir supplying the high zone, the Belle Vue supplying the middle zone, and the Park supplying the lower zone, the reservoirs holding in the aggregate between 5,000,000 and 6,000,000 gallons, and all covered with the exception of the Park. The reservoirs are well constructed to secure the providing of the water supply. There is constant service, and the arrangements in the town seem to be perfect. I understand that the supply is kept up without intermission. The consumption of the water, too, is as economical in the matter of management as it possibly could be. The consumption is about 20 gallons per head per diem, and one-third of this is for trade purposes, leaving about 13 or 14 gallons for domestic purposes, showing that the works are well managed. Where they are not well managed, the consumption often rises to 50 or 60 gallons per head per diem. Where the consumption is kept as low as in Nottingham, it shows careful management, and there is good service. In London the consumption is about 30 to 33 gallons per head per diem. The rates of the Nottingham Company, as compared with those in other towns, appear to be very moderate. I have not gone into the question of the proposed new works, but I have been through the district proposed to be included in the area of the Company, and from what I saw I should say that a supply of water to those places is very much needed. I should say that a Company having large supplies of water from a central point as this Company have, could supply these places more advantageously than they can supply themselves. I have had opportunities of considering the effect of the compulsory transfer of such works as these to Local Authorities, and I cannot see that there is any advantage at all. This is one of the best Companies that I know, giving the best possible supply in the best way. I cannot see where there would be any advantage in the transfer to the Corporation, or what the Corporation could do for the inhabitants that is not done at present. I think, indeed, that there is more done at present than there would be if the transfer were made, because there is a control—and a sharp one, no doubt—exercised over the Company by the Corporation.

Cross-examined by Mr. VENABLES: In the case of a transfer, the Corporation would be able to supply the public directly, but they would be under no control. In some cases, Corporations have managed water-works very well, and in others very badly indeed. It does not follow of necessity that the Corporation taking the water-works, they must necessarily manage them well. The quality of the water obtained by the Company at Scotholme is, perhaps, not so good as the others, and as the quantity is small, they might, perhaps, dispense with it. Including Scotholme, the Company have five-eighths of their supply in reserve, and five-eighths of the present pumping power is not used. I do not think the whole of this reserve could be supplied without further works, because it would exhaust the whole of the engine power, and, as everybody knows, there must be duplicate engines. Then whether the wells would hold out I cannot say. The pumping power should always be in excess of that which is wanted for supplying the water consumed. There might be a break-down, and it is necessary to be prepared for such a thing. I assume that if the proper steps were taken, they would be enabled to supply nearly 9,000,000 gallons of water a day. Assuming that the district largely extended itself, it might be advisable to establish reservoirs in more convenient places. I can quite understand that it would be convenient, when a district largely extended, to seek a new well. I was Secretary to the Royal Commission on Water Supply, of which the Duke of Richmond was the Chairman. I drew up their report.

Mr. VENABLES: The concluding part of the report says that the duty of supplying a city with water had, from an early period, been regarded as purely a municipal function. The supercession of municipalities by joint-stock companies was a modern innovation, the New River Company being about the first formed. Since that time private companies had, to a considerable degree, exercised the functions, but of late many towns had come to the conclusion that the modern system was a fundamental error, and that water should be supplied by the municipalities themselves. I suppose if that report had to be written at the present time, you would have added several other towns to those mentioned, as having acquired control over the water supply?

Witness: Yes.

Mr. VENABLES: The report quotes the opinion of Sir Joseph Heron, Town Clerk of Manchester, and others, and says that Mr. Hawksley, Consulting Engineer of Liverpool, is not favourable to Corporations having the management of water-works, for the reason that public bodies are under external influences. It also says that legislation should restore the ancient practice, and alludes to the increasing wealth of municipalities, and the facility with which water can be supplied by them?

Witness: I should like to explain that the Commission were engaged in considering the question of the supply of water in the Metropolis by the Municipal Authorities. They were anxious to state what were the grounds on which this transfer should be made, and it is a singular fact that not one of those grounds applies to Nottingham. The Commissioners took a deal of pains to show what led them to the conclusion they arrived at. They said the system they were in favour of was the only effectual one which could be adopted for giving the Metropolis a constant supply of water. That does not apply, for a constant supply is given with the greatest efficiency at the present moment in Nottingham. Then they go on to say that there was a difficulty in supplying the poor of London with water—a difficulty of a financial character, which Companies would not have power to deal with. That does not apply to Nottingham, for I have never heard that the poor are not well supplied. If there is anything to complain of on this head, the Company are ready to meet the complaint, and provide a remedy. The report says the new system—viz., the supply of water by the Municipality, will improve the quality of the supply, but that does not apply to Nottingham, the water given there being of the finest quality. The report also says that the Local Authority could then spuply water for the extinguishing of fires, but that again does not apply to Nottingham, for I am told that the water is supplied to the Corporation at considerably lower than cost price. There would be some economy, no doubt, in the Municipality borrowing the money, as they would get it at a less rate of interest than a Company. I think a Company are worthy of their hire, and that they should be allowed to make a profit. If a Company manage their works as well as the Nottingham Company have managed their affairs, and take all the risks, I do not think it is too much to pay them the fair value for their money laid out.

By Mr. STEPHENS: The Company's pipes come to the boundary of the Hucknall district, and the supply of water there would be from the Belle Vue or Red Hill reservoir. I cannot say the date when the pipes were laid up to the boundary.

Re-examined by Mr. POPE: If the Corporation have to buy at a large price on account of prospective value, they can borrow at 4 per cent. instead of 5; so that, whether they pay for it at present value or prospective value, there is not much in it. I have known a very large claim to be made for prospective values.

Mr. *F. J. Bramwell*, C.E., examined by Mr. POPE.

I have read the petition of the Hucknall Local Board, and I have recently visited Nottingham, and examined the sources of supply. I know the provisions of the Acts of 1845, 1854, and 1874. I think Nottingham water is one of the very best supplies, perhaps the very best supply, in the United Kingdom. The water is of wonderful excellence and purity. The supply is constant; any one can draw as much of it as he will, and yet there is the greatest possible precaution taken to prevent waste. These are the elements which I think go to make up a good supply of water anywhere. All the reservoirs are covered except one. To give you an idea of the purity of the water, I may say that if you open one of the doors of the reservoirs, in which there is not much light, you can see every joint in the floor of the reservoir through 8 or 9 feet of water with the greatest possible ease. I know something about the quantity of water the Company can supply per day. I do not know that the limit has been reached, but I know what has been stated to be the maximum pumping power, assuming every engine to be working day and night. Still that is no *datum* for supply. You must have a duplicate engine; and in the next place you do not work an engine night and day. Thus you should make a reduction on the maximum power of 40 per cent. at least. I have been told that after pumping has been going on at Bestwood for several hours the water is reduced to within about 20 feet from the bottom. That is a pretty good indication of the capacity for yield of the Bestwood well. The average consumption is put down at three million gallons a day. But you must not take average consumption; you must take consumption in dry weather, and that is four millions. Taking the pumping and wells as they are, I do not think the present supply is too much for the present district, and I do not think the Company would do wisely to take a larger district without an increased supply. The Company's charges, compared with London, are moderate, and they deal very liberally with their consumers. They supply 33,000 houses, and out of those there are absolutely only 281 which are above £70 a year in rental value, and that shows all the more to their advantage. In 1851 their gross income was £5800; in 1861, £14,800; in 1871, £20,700; and in 1877, £32,800; and I find that last year, 1877, there was an increase of £2597; and moreover, notwithstanding the depressions and fluctuations of trade, there has been a constant increase from 1871 up to the present time. For the last six years only there has been an increase of more than 50 per cent. Looking at the district, there can be no doubt that a further supply is wanted. Nottingham is well known as one of the most thriving of our towns. In the same neighbourhood there are a number of villages approaching the dimensions of small towns. It is natural and proper (and cheap) that they should take water from the Company. I do not know of any local circumstances about Hucknall that should make it different to others.

Mr. POPE: Have you considered the Corporation and their position? Is there any reason why the Nottingham water-works should be taken out of the Company's hands, and put into the hands of the Corporation?

Witness: I think not; and up to the present time it has not been the practice of Parliament, without some good cause, to give Corporations power to take properties from Companies compulsorily. And in this case I cannot see that there has been any lacking in duty. As far as I know, there is not any power which the Corporation, as a Sanitary Authority, could exercise, if the water supply were in their hands, that they cannot

exercise now. There is no allegation that at the present time the sanitary wants of the inhabitants are neglected by the Company. I should consider it a great hardship if auction clauses were imposed upon the Company.

Cross-examined by Mr. VENABLES: I agree with Mr. Hawksley that the Company have acted very liberally to their customers by allowing them to take as much water as they like. In restricting waste they have also been most liberal. They might have added to their rates without being extortionate. They are entitled to credit for keeping their rates so low and paying full dividends.

Mr. *Hawksley* said: I wish to supply a correction in my evidence. On the first day of the inquiry I was asked about how the capital was expended. We expend about £5000 a year in the whole of the district, in extensions and improvements. I gave only £2000, which would be the amount for extensions in the new town; but there is £3000 a year for extensions and improvement in the old district, and that would give us £5000 a year for the whole district, for extensions.

This was the case for the Water Company.

Mr. VENABLES then addressed the Committee in opposition to the Water Company's Bill, and in favour of the Bill of the Corporation for compulsory purchase of the Company's works. He said: The two things are inseparably connected, and I may say that the substance of our petition is that if the Committee do not give the Corporation the power of compulsory purchase, then they shall, as to the issue of any new capital that may be considered necessary, impose upon the Company the auction clauses under which the Company existed until four years ago. The effect of this will be very much like that of compulsory purchase by the Corporation, for under those clauses the capital will be raised at the market price of the money, without premium to the Shareholders, and that is the main and central reason that the Corporation urge for the purchase of the undertaking. If the auction clauses are imposed the Corporation will be less urgent in wishing to get the works. They would prefer to acquire the works for various reasons, and probably the Company would cling less to the property if it was understood that they were not to make a profit out of the consumers, but that their capital should be provided at the natural market rate. With regard to administrative details, they become less important in a case where, as I admit it has been here, the Company's administration has been good; where there is ill administration it is of great advantage, apart from the cost of works or new capital, to put the control of these undertakings in the hands of the Corporation. Here, while the good management continues, I admit that the necessity is less. We might, of course, have done what is often done, we might have collected complaints and grievances, and 170,000 people are never without complaints which they are willing to find an opening for. We might have dealt with petty points, such as that of one of the wells being, as one of the witnesses has acknowledged, not so good as the others. But these are not considered in our case, and it is, while acknowledging that the Company have done their work well that we submit the reasons for the purchase of the undertaking, or as an alternative, the auction clauses. The Company themselves have given a sufficient illustration of the advantage of these auction clauses. Upon the moderate capital of £75,000 the Company continued to go on extending their works, supplying the wants of the town, and managing everything exceedingly well for nine years—until 1854. The Company then required an additional £150,000, and again the auction clauses were inserted. At that time there was some interference on the part of the Corporation, but how far this produced the auction clauses I am not in a position to show. It is evident, however, that it must have been to the interest of the Corporation that the money should be raised at the lowest possible rate. Whether the auction clauses in this instance were adopted voluntarily or by pressure, they again raised the money on the auction clauses. They increased their capital from £75,000 to £150,000, and they have raised and spent altogether £350,000, or, in fact, they have spent £275,000—because £50,000 was shown to be fictitious and imaginary, being the result of the alteration in 1854. They got, then, £250,000 at 5 per cent. of nominal capital; but, as Mr. Hawksley said, it would not have mattered if it had been 100 per cent., because the auction clauses were there, and the capital must be raised under their provisions. The Company went on extending their service, and providing for the exceptional case of enclosure mentioned by Mr. Hawksley, for 20 years, and that with their capital, £100,000, obtained in 1854. In the interval they made two attempts to obtain additional capital, but in neither case did they succeed. I should say, however, that in addition to expending £100,000, they incurred liabilities to the extent of £20,000 or £30,000, so that the total expenditure may be stated at £130,000. It did not matter to them whether they used the share capital or not, but as a matter of fact they did use it, and did not call up the debentures. Premiums on shares, nominally 5 per cent., were added to the capital, but did not carry dividend. In 1869 they applied for £250,000 of share capital without the auction clauses. That Bill was opposed by the Corporation, on the ground that the 7 per cent. the Company wanted was what they ought not to have, and also that the auction clauses ought to be imposed. The Bill was defeated. In 1873 the Company again came to Parliament, and asked for £250,000 without the auction clauses, and with 7 per cent. Again the Corporation opposed, and again their opposition was successful, and the Company remained without their new capital and with their auction clauses. But in 1874 they came to Parliament, having reduced their demand from £250,000 to £100,000, which shows you how very capricious the demands of these Companies are. They asked for less than half the original sum, because no doubt they thought they would be more likely to get it. They asked for this at 7 per cent., and proposed to omit the auction clauses. The Corporation again opposed, and succeeded in reducing the 7 to 5 per cent., but did not get the auction clauses retained. That decision the Corporation have had great reason to regret. As you have heard, Mr. Hawksley, though knowing that part of that capital—namely, £20,000 to £30,000—was required to discharge existing liabilities, informed the Committee that this £100,000 would probably last from 16 to 20 years; but the result of the auction clauses being removed was that, whereas £100,000, with £28,000 obtained from premiums on shares, had sufficed from 1854 to 1874, £150,000 have only sufficed to carry the Company from 1874 to 1878. Within a few months after the Act was passed, the whole of the new £100,000 was issued nominally in shares of £19 5s., and this although the capital could not have been required then. It was issued, and was immediately saleable, and was in many cases sold in the market at four or five premium, so that the Act of Parliament was at once turned into a bonus for the Shareholders before a single shilling was required for the undertaking. Of course, the premium has increased as the capital has been called up, and the whole of the capital has been called up since. These shares are, no doubt, now of the same value as the others, so that if you take £100 stock of them it would be £150, and the shareholders will have paid up within three years—because it was called up in 1877—£100,000, and the property has been worth £150,000 in the market. Therefore, for the benefit of this money, spent in a fourth or fifth of the time in which it was said it would be spent, the town has had to pay £50,000—for this amount does come out of the consumers in the long run; and if Parliament could have foreseen that result, it is extremely improbable that they would have removed the auction clauses, the existence of which would have prevented this state of things. The Company's interest in spending as much capital as possible, and as fast as possible, has produced that liberality of which Mr. Hawksley boasts. He says the Company are liberal in meters and pipes, and in other things they are unusually liberal; but Mr. Bramwell says it is all capital expenditure, and the more capital they can expend the better off they are. Here in the present Bill they are applying for more capital, their ground being their desire to include these outlying districts in their area. But Mr. Hawksley puts the cost of including these places at £60,000, and they want £150,000, which will be immediately converted into a bonus of £75,000; and I think I can see grounds for a further application, in the desirability of extending the supply to Trowell and other places not included in this Bill. That will be an excellent ground five years hence for another application to Parliament. I do not say that all these things are deliberately contemplated, but this is likely to be the course of events unless the auction clauses are inserted, or, which would be simpler, the Corporation purchase the works. You, sir, examined Mr. Hawksley at some length as to the purposes to which this money is to be applied, and you will be able to judge how far he exhausted the amount. My learned friend did not cross-examine him on that ground, for this reason—our contention is not really that the sum should be reduced, but that, if granted, it should be on such terms as not to impose an additional burden on the community. We do not materially object to the Bill if the auction clauses are imposed, because then the money will not be called up till it is wanted. When the Company had expended the whole of their £100,000 of share capital, they had still left £47,000, since reduced by £7000 of other debentures, and because they would make no profit by issuing debentures they did not issue them, although Parliament had given them that power. Part of them were under the last Act, and part under the old Act of 1854. Not only did they not issue further debentures, but they bought in old ones. They had certain mortgages, and what they did was this—the capital which had been granted by Parliament, because it would be required in 17 or 20 years for the supply of the district, they applied to the extent of nearly £30,000 to paying off these mortgages, which probably they need not have paid off—indeed, nobody had said that the mortgagees wanted them paid. The result is that this was converted into share capital, and they have now unexhausted, a power of £40,000 of borrowing, and Mr. Hawksley says that they have £28,000 in value of land, and, from what he says, we are justified in assuming that the land is worth that amount. This sum, therefore, added to the £40,000, gives £68,000, and that is a considerable sum. A nominal grant of power to raise further capital would, as I say, do us little hurt; but nobody, I maintain, has the right to obtain money until it is wanted. In this case Mr. Hawksley says the auction clauses were voluntarily introduced, and my learned friend treated them as a parodoxical innovation. They were put in several Acts of Parliament, but where subsequent capital has been raised they have been struck out, and struck out probably on such a contention as that of Sir Edmund Beckett. What the practical effect has been I have shown you. The auction clauses have been re-introduced of late years in a case scarcely distinguishable from water—namely, that of gas, and the financial principles of gas supply are precisely the same as those of water supply. Under Acts passed in the year 1847, for providing a maximum statutory dividend and reserve-fund, both Water and Gas Companies were compelled to reduce their rates. The Standing Order with respect to Gas Companies is this:—"That in every Bill provision shall be made for the offer of such capital by public auction or tender at the best price which can be obtained, unless the Committee on the Bill shall report that such provision ought not to be required, with the reasons on which their opinion is founded." Therefore the rule is that there is to be an auction or tender clause, unless there is something exceptional. There is to be such a clause inserted in every Bill, unless there is something very exceptional with regard to it. The corresponding Standing Order of the House of Lords is, that in every Bill by which an existing Gas Company is authorized to raise additional capital, unless the Committee on the Bill shall report that such provision ought not to be required in the interests of the public, and the reasons on which it is founded, the auction clause shall be inserted. The House of Commons have given the Committee power to insert a sliding clause, but not so the House of Lords, who have not even thought proper to refer to it. These things were first introduced in private Bills, and afterwards incorporated in the Standing Orders. The sliding scale was proposed to the House of Commons in 1875, in a Bill in reference to the Gas Companies of London. That measure was projected by the Metropolitan Board of Works and the Corporation of London, and its object was to make provision for the control of the Gas Companies. It was referred to a Committee specially selected—a hybrid Committee presided over by Mr. Forster, the member for Bradford. They had a very long inquiry, and the result was they adopted the sliding scale. Directly the sliding scale was introduced, the auction clauses were also introduced as a matter of course. The result was that both Houses resolved on making the auction clauses a Standing Order, and the Companies have no longer any of those prospective advantages they may have had before. The object of the Legislature was that money to be raised for a public purpose should be raised on the lowest possible terms that could be obtained. The best thing that can be done in the present case is for the Water Company to agree to the sale of their undertaking to the Corporation of Nottingham. This will put an end to discussions about capital. There is a proof of the general feeling in favour of the purchase in the fact that the Corporation wish it—and it must be remembered that they represent the wishes of their constituents. Sir E. Beckett says it takes a long time to change the members of the Corporation; but it so happens that, last year, Nottingham passed an Improvement Bill, and under the provisions of that measure there was a new election, so that at the present time the Corporation represent the opinions of the people of Nottingham up to last November. A matter such as this now before the Committee is pretty nearly sure to be taken into consideration by the ratepayers in the choice of representatives. The question now comes whether there should not be a compulsory purchase. Mr. Hawksley is opposed to it; but his opinion finds fewer and fewer supporters every year, and transfers are continually taking place. No doubt, as some of the witnesses suggested, the Company are holding back so that they may get better terms. But the terms we are disposed to offer have been included in a letter addressed to the other side yesterday. We are prepared to give 30 years purchase of the maximum parliamentary dividends, to pay up arrears of old dividends—which, I see, amount to £6000—to pay off the mortgage debts, and all debts and obligations, and pay such sums for officers, &c., as may be agreed upon. The Council will undertake to supply the district proposed to be included in the present Bill.

Mr. MICHAEL: It is impossible that you can pass this portion of the preamble without evidence.

Mr. VENABLES: I did not suppose that this letter required proof. You have it in your hands. If you want more than I have said, I will tell you that I now make this offer on the part of the Corporation.

Mr. MICHAEL: You must give evidence.

Mr. VENABLES: The offer we have made to them is equivalent to giving them £150 for every nominal £100 we take, and to pay 6 per cent. for each

£100, with the option of 25 years purchase; or 30 years purchase of their undertaking, which works out to the same thing. Further than this, the Corporation think it is important to the interests of the town that they should acquire the works; and, if the Committee should think that 6 per cent. is not enough to give them, they are willing to go to the extent of 6½ per cent. They will abide by the decision of the Committee. That is the offer we make. Mr. Bramwell mentioned the expectation of prospective value, but that has been allowed for in the present market value of the shares. There can be no doubt that a considerable part of the present price is owing to the expectation of the purchase we are now endeavouring to bring about. The result of what we propose would be to do the fullest justice to the Shareholders. Since the Committee heard Sir E. Beckett's speech, a decision has been given in another room, in which compulsory purchase, or something very like it, has been allowed.

The CHAIRMAN: Do you mean in the Cheltenham Water Bill?

Mr. VENABLES: Yes. The Committee have put a strong pressure on the Company; because, although they have not decided the question, yet they have thrown out the Company's Bill, and have adjourned for the purpose of enabling the Corporation to come to terms with the other side as to the price to be paid for the undertaking. It has been said that there is no precedent for a compulsory purchase, but against that I have to point out that a good judge never goes beyond the absolute necessity of the case. The question here is not one between two competing Companies, but between two kinds of administration, and two modes of raising capital. We, the Corporation, must raise capital as cheaply as possible, whilst it is to the interest of the Company to raise capital as abundantly and profusely as possible. If the Committee should think that precedent is not sufficiently established for compulsory sale, we ask for the alternative of auction clauses.

Alderman *Thackeray*, examined by Mr. VENABLES.

I think it is desirable that the undertaking of the Water Company should pass into the hands of the Corporation, who have always been willing to pay a fair price for it. It is desirable because the capital could be raised at a cheaper rate, and there are many other reasons to be urged for the transfer of gas and water works to Corporations. I see no reason why the Company should hesitate to transfer their works, supposing they can get the full value of them. The Corporation have no unfriendly feeling towards the Company, and have no wish to deprive them of their rights. I believe that, at the last municipal election in Nottingham, this question was one that weighed considerably with the ratepayers. The same feeling now exists among the ratepayers in general in favour of the transfer. I think that what is proposed would be perfectly fair to the Company, at least; but we think it far better to have compulsory sale. We still hold ourselves bound by the original proposal of transferring the works by open arbitration. It would be much better if the works were transferred amicably than by arbitration. Let the Company consider that we offer 6 per cent. instead of 5 per cent., and we are so anxious to do everything that is proper and fair that we are willing to put ourselves into the hands of the Committee to the extent mentioned, of making it 6½ per cent. if the Committee should think 5 per cent. not enough. We are quite ready to abide by the decision of the Committee to that extent.

Mr. VENABLES: My learned friend, Mr. Michael, has said that, technically, I am bound to call witnesses. I am not aware that I am bound to call a witness. If I do call a witness it will simply be to corroborate what I say. There are a number of gentlemen from Nottingham, members of the Corporation of Nottingham, among others, whom I could put into the box; but they would only tell you what I can tell you much more shortly, that the transfer of these works is much desired by the inhabitants, and that it would result favourably to them if it were done. But I will not trouble the Committee with evidence. As I have said, the witnesses could only give evidence in corroboration.

Mr. MICHAEL: This is a case of two competing Bills. It is quite true that if we withdrew our petition against the Corporation Bill it might go before another Committee as an unopposed Bill. But that has not taken place, and my friend must call witnesses to endeavour to substantiate the preamble of his Bill. I pass for the moment from his allegations, and I would remind him that there are gas and improvement clauses as well as water clauses; and, as I have said, the two Bills being competing Bills, the first question to be decided is the power of supply.

Cross-examined by Mr. MICHAEL: The introduction of auction clauses into the Company's Bill would enable them to raise money at the market value. It is to the interest of the ratepayers that this should be done. No complaints whatever have been made as to the conduct of this undertaking. I think if the Corporation had it in their own hands, they would be more careful of the expenditure incurred in the supply of water. By withdrawing the auction clauses, there is an inducement to the Company to spend money lavishly in order to get premiums. I am rather astonished they have had to come to Parliament again so soon. If the undertaking were transferred to the Corporation, the Engineer of the gas-works could be the Engineer of these works, with perhaps some slight addition to his salary, and in that way money would be saved. I do not say that the Company have come to Parliament to ask for money for which they have no call, but I say that if the concern were in the hands of the Corporation, instead of paying 5 per cent. upon £150,000 they could raise money at 4 per cent. It will be no benefit to the Shareholders if the new capital is to be raised by auction. If the power to raise the new capital required for water-works purposes were transferred to the Corporation, it would be a benefit to the Shareholders, because it would enable the Corporation to increase the dividend they propose to give them.

(To be continued.)

EFFECT OF SULPHUR IN GAS ON COTTON GOODS.—At the last meeting of the Chemical Section of the Philosophical Society of Glasgow, Dr. William Wallace, Gas Examiner and Public Analyst for the City of Glasgow, read a short paper on the destruction of the colour of cotton goods by the sulphur in the gas burned in the London warehouses. Sulphuric acid, he said, was found in considerable quantity in the goods after being some time exposed, while the same articles in the fresh condition were quite free from that acid. In some cases the cotton fibre itself was rendered so tender as to be perfectly useless. The same thing had been observed in the warehouses in several large towns in England, such as Leeds, Manchester, &c., where common coal, containing much sulphur, was used as the source of the gas supplied to the consumers, but only to a limited extent. The remedy which was recommended by Dr. Wallace was the thorough ventilation of the warehouses, so as to ensure that the sulphurous and sulphuric acids generated by the burning of the gas might have a sufficiently free escape into the atmosphere. He also suggested the free use of lime for whitewashing the walls of the warehouses, so that the acid vapours floating in the more or less confined air might combine with the lime. He exhibited a number of specimens of the goods which he had examined after they had been sent back by the London merchants as damaged to the manufacturers. Both in colour and in strength they were seen to have suffered detriment by exposure to gaseous fumes.

Miscellaneous News.

IMPERIAL CONTINENTAL GAS ASSSOCIATION.

The Half-Yearly Ordinary Meeting of the Proprietors of this Association was held at the City Terminus Hotel, Cannon Street, London, on Monday, May 27—Sir JULIAN GOLDSMID, Bart., M.P., in the chair.

The SECRETARY (Mr. Albert F. Jackson) read the advertisement convening the meeting, and the corporate seal was affixed to the register of proprietors. He also read the following report:—

The present half-yearly ordinary meeting of the Shareholders has been convened, agreeably to the Company's Act of Parliament, for the purpose of receiving a report from the President and Directors upon the affairs of the Association, and for declaring a dividend for the half year ended the 31st of December last.

Gas Made.—The total quantity of gas made at all the stations in the half year ended the 31st of December last was 2698 million cubic feet. The total quantity made in the corresponding half year of 1876 was 2614 million cubic feet, showing an increase of 84 million, or at the rate of 3·21 per cent.

Lights.—The total number of lights at all the stations on the 31st of December last was 1,155,388. The total number on Dec. 31, 1876, was 1,095,671. These figures show an increase of 59,717, or at the rate of 5·4 per cent.

Mains.—The total length of mains laid up to the 31st of December last was 1134 miles. The total length of mains on Dec. 31, 1876, was 1077 miles, being an increase of 57 miles. Much attention has, as usual, been given, during the period now under review, to maintaining the various works in a thoroughly serviceable condition.

Mr. G. W. Drory has continued to exercise the general superintendence of the affairs of the Association on the Continent, and has received, as hitherto, the hearty assistance and co-operation of the several Engineers and Agents.

The Directors have had reason to be satisfied with the results of the work undertaken by Mr. Wingfield; consequently that gentleman has been permanently appointed as General Inspector of the Accounts of the Association on the Continent.

The rental and the profit for the half year ended the 31st of December last were greater than for the corresponding half year of 1876.

The cost of the coal employed in the half year now under review was less than that of the coal used in the corresponding half of 1876.

Secondary Products.—There was a considerable diminution in the value of two of these—viz., of 14·62 per cent. in the coke, and of 8·32 per cent. in the tar. There was, however, an increase of 19·78 per cent. in the value of the ammoniacal liquor.

In the half year under consideration, considerable sums were expended for improving the purifying apparatus at several of the stations, the most important items under this head being at Vienna for scrubbers and purifiers, and at Amsterdam and Rotterdam for purifying-houses.

In order to keep pace with the increased demand for gas, a large gasholder (100 feet diameter) was erected at Tabor, one of the Vienna stations, for which a tank and house were also completed.

At Schöneberg, a suburb of Berlin, a large sum was spent on account of a new tank (102 feet diameter).

At Antwerp also, at the Dam works, the erection of a new tank and new gasholder (80 feet diameter) necessitated a considerable outlay.

The erection of new offices and of a new Engineer's dwelling-house were completed at Berlin, and similar buildings were proceeded with at Ehrenfeld, our station, near Cologne.

A short railway branch from our works at Forest, near Brussels, to the Forest station, was completed during the half year at a heavy cost. It is hoped, however, that this may be compensated for by a considerable saving in the carriage of coal and materials.

For extensions of the system, and the substitution of larger for smaller mains at the various stations, large sums were spent, more particularly at Vienna, Amsterdam, Berlin, and Frankfort.

At Vienna, additional land was purchased for the extension of the Tabor works, and in the suburb of Baumgarten for the erection of new works.

At Haarlem, where the Association has been much in want of room, some land was bought.

At Frankfort-on-the-Maine, a new contract was concluded, during the period now under consideration, for lighting one of its suburbs, the commune of Hausen.

A most painful duty is imposed upon the President and the Directors of formally announcing the death, by a railway accident on the 2nd inst., of their highly esteemed and valued colleague, Sir Francis Henry Goldsmid, Bart., M.P., to whom, in no inconsiderable degree, the Association has been indebted for much valuable assistance afforded during a period of nearly 26 years, and who at all times took the greatest interest in its progress and success. Sir Francis Goldsmid ever most willingly brought to bear upon the counsels of the Board, and for the benefit of the Association, great legal tact and experience, and a sound and ripe judgment.

The President and the Directors desire in conclusion, to draw the attention of the Shareholders to the accounts for the half year ended the 31st of December last. These have been duly audited, and from them the Directors have, in accordance with the provisions of the Companies Clauses Consolidation Act, prepared a scheme showing the profits of the Association for the last half year, and the portion thereof applicable to the purposes of dividend which the President and the Directors recommend now to be declared—namely, a dividend of £2 10s., and a bonus of 10s. per share, payable, free of income-tax, on and after the 15th of June.

The Directors who go out of office by rotation are Thomas Henry Goodwin Newton, Esq., Colonel Josiah Wilkinson, and Philip Twells, Esq., M.P. The Auditor who goes out of office is Thomas Newton Stokes, Esq. These gentlemen are all eligible for re-election, and offer themselves accordingly.

The CHAIRMAN: Gentlemen, on behalf of the Board I have to move—"That the report upon the affairs of the Association now read be received, adopted, and entered on the minutes." The few observations I have to make in reference thereto will not, I think, detain you very long. The accounts speak for themselves. You are aware that the price of coal has been very low, and, as I have often stated before, and as has been stated by my predecessors, Gas Companies must mainly depend for their profits on the price of coal. The residual products, and especially coke, have not been so good in their results as they are when the price of coal is higher; and that is always "the other side of the question" in this matter of profits arising to Gas Companies. The total results of our operations for the half year under consideration is eminently satisfactory. The Board, as you are aware, have been endeavouring, for some years past, notwithstanding the very large sums that have been expended on capital account, as the profits therefrom necessarily and properly increase, whether bound by contract or not, to give the consumers every reasonable advantage which they could fairly expect from the Association. They have thought it, therefore, their duty, as far as possible, to adopt everything which might be of benefit in the working of a Gas Company—or rather I should say everything that has been proved to be of benefit, whether in the matter of production or purification, and, of course, the result has been that we are, as I think, able to show that our works are in a thoroughly satisfactory condition. Now the final result of the half year's proceedings is that we are able to propose to you to-day a dividend of £2 10s. per share, and a bonus of 10s. per share. Last half year the dividend was £2 per share, and there was a bonus of 15s. per share. Now, as I have pointed out before, of course, the half year under consideration is the best half year, because it is the winter half year, and consequently the profits of the other half are never so good. But we think that we see our way permanently to give a dividend of £2 10s. per share, and for this reason we have announced it at that rate on this occasion, instead of £2 as last half year. The other part—the bonus—must, as I have before pointed out, depend partly upon which half year it is, and partly on the prevailing price of coal at the time. If coal rises to a considerable extent, there will be no bonus at all; if it remains low, I think you may fairly expect to get a bonus on future occasions. There is another matter to which I think I ought now to refer, and that is the question of our capital account. At very many meetings which have been held here in the past the Shareholders have expressed a desire, in which the Board have concurred, to write up the uncalled amount of £6 5s. on each share, and you will remember that I told you last year that, as the result of the opinion of Counsel, we found we should be obliged to go for an Act of Parliament to obtain the

necessary permission to do this. I was unable to be present at the meeting, at which Mr. Wood presided, which was held for the purpose of obtaining your consent, which I believe was unanimous, to the Bill which we introduced into Parliament this session. I am happy to say that that Bill has, with some slight modification, become law, and therefore the uncalled amount on the shares of the Association is now considered to be written up out of the sums which from time to time have been expended from profits for the enlarging of our works. In addition to that, we have succeeded in obtaining other powers, which, as I stated before, we thought it very desirable to obtain, and which, I believe, will be of great importance in the future history of this Association, and will prevent the necessity for going to Parliament again for the same object. It is well known that we spend, on capital account, a considerable sum of money every year out of profits; we have, therefore, taken power in our Act, from time to time, when we think it desirable, to distribute *pro rata* among the Shareholders capital stock to represent the amount so employed by us for capital purposes. I think that is eminently in the interests of the Shareholders, and it is a very great advantage that we should have that power completely in our own hands. It will obviate any difficulty in the future such as there has been in the past, and I think it will place the Association on a most satisfactory footing. Then there is another matter upon which I should like to say a few words. Of course, as every Proprietor knows, with 14 stations in different parts of the Continent, we have many varying systems of business. But we have thought that the time has come when, if we could get a man capable of undertaking that class of work, it would be desirable that the whole of our accounts should be established upon a uniform system, although they are in different countries. We consider ourselves, therefore, fortunate in having secured the services of Mr. Wingfield, who is the right man for that purpose; and he has begun to initiate a system which must involve a considerable amount of time and trouble, but up to this present he has shown that he is sparing neither the one nor the other. In the permanent appointment of Mr. Wingfield, we think we have been able to do a valuable service to the Association. In order to give the Proprietors an example of the work which can be done well by a man of that character, I will just mention a fact that has occurred at Vienna. Our Chief Accountant and General Cash Agent there is a man in whom the Directors of the Association have had great confidence for many years. He has lately begun to yield to that ill to which all men must submit—he is getting old; and he was training up a son to assist him. But that son died two or three years ago, and the result has been that a certain amount of remodelling of the office has been required. But in order to remodel an important office like that in which the business of a Company lighting a town of 600,000 or 700,000 inhabitants is carried on, great care and prudence are requisite, as well as peculiar judgment in the selection of individuals. Mr. Wingfield has been at Vienna for several months past undertaking that duty, and, as far as we are able to judge, he has accomplished it, not only to our satisfaction, but in the very best manner in which it could be accomplished. It is a kind of work requiring a man of judgment and discretion and great tact, and Mr. Wingfield, in these respects, has shown that he is worthy of our confidence. Now, there are only two or three other points to which I have to refer on behalf of the Board. The Association has arrived at a period of prosperity when a difference of opinion is scarcely ever heard at its half-yearly meetings. In times long gone by—I think long before I had anything to do with the management of the business of the Association—we were neither so happy in the payment of dividend—because, I believe, at one time, we paid no dividend at all—nor so happy in the unanimity which now exists between the Shareholders and the Board. I say happily that time has long gone by. My uncle (Sir F. Goldsmid), whose loss we all deplore, has often, at the time when those differences of opinion existed, done good service to the Association; and I think, owing to his judicious management and that of others, it came to be seen after a while that it was to the interest of both Board and Shareholders that there should be more unanimity and more cordiality. With increased prosperity we have arrived at that unanimity; and thinking on this point, there is one thing which it seems to me ought to be a source of congratulation to us all—I mean that the gentleman who from the first has been so active in attending to the business of this Association (Sir Moses Montefiore) is still our President. We had hoped to see him here to-day. He attended a Board meeting last Wednesday, and seemed as active and zealous as ever. He continues to take the intelligent and anxious care for the interests of the Association which he has manifested for the last 54 years. Gentlemen, I think I have nothing further to say on behalf of the Board. We have been desirous during the past half year, as in former periods, to do all in our power to serve the interests of the Shareholders, and to meet all their reasonable wishes and expectations. I think, especially in the matter of the Act of Parliament of which I have already spoken, we have done our best, and that in the result we have been most successful. If there is any point upon which the Shareholders require information, I shall be ready to give it, and with these few words I move that the report be received and adopted.

Mr. Wood seconded the motion, which was put and carried unanimously.

On the motion of the Chairman, it was resolved that a dividend of £2 10s. per share and a bonus of 10s. per share be declared upon the 56,000 shares of the Association for the half year ended the 31st of December last, and that the said dividend and bonus be payable, free of income-tax, on and after the 15th of June.

The retiring Directors, Mr. T. H. G. Newton, Colonel J. Wilkinson, and Mr. P. Twells, M.P., were severally re-elected.

The retiring Auditor, Mr. T. N. Stokes, was re-elected.

It was then resolved that the cordial thanks of the meeting be given to the President, Chairman, and Directors, for their able management of the affairs of the Association, and to the Chairman for his conduct in the chair that day.

The Chairman acknowledged the vote, and said he could speak for his colleagues as for himself, when he said that they were most happy in having conducted the affairs of the Association to a result so favourable as that now witnessed, and in closing the proceedings of the meeting, he would propose a resolution, which he was sure would be heartily responded to—viz., that the thanks of the Shareholders be given to Mr. G. W. Drory, the General Superintendent of the affairs of the Association on the Continent, and to the Agents, Engineers, and other Officers of the Association.

The motion having been adopted, the proceedings terminated.

Quality of the Birmingham Gas.—Mr. Thomas Jackson reports that during the month of May, at the four gas-making stations of the Corporation, he made 20 examinations of the illuminating power of the gas supplied to the borough. The maximum light in sperm candles was 17·72; minimum, 16·43; average, 17·16. The parliamentary standard is 15 candles with Sugg's No 1 "London" burner.

BAHIA GAS COMPANY, LIMITED.

The Half-Yearly Meeting was held on Thursday, the 23rd ult., at the London Offices, 10, Coleman Street—Horatio Brothers, Esq., in the chair.

The following report was presented:—

The Directors herewith present the audited statement of accounts for the half year ending Dec. 31, 1877.

The Directors regret to have to report a defalcation in the office at Bahia, amounting, as far as can be ascertained, to about £2000. Part of this has been written off the revenue account of the half year under review, in consequence of which the Directors are unable to make the usual addition to the reserve-fund, although the same dividends are recommended as before. As soon as the defalcation was detected, the Directors sent out a gentleman, well acquainted with Bahia and the Company's affairs, to make a searching investigation, which the Directors hope may result in the discovery of the weak spots in the administration at Bahia, and in removing the causes which have hitherto obstructed the prosperity of the Company.

The profits for the half year, £3624 18s. 5d., added to the balance brought forward, make the sum of £3907 19s. 2d., out of which the Directors recommend the payment of the preference dividends of 10 and 7½ per cent. respectively for the half year, and that a dividend of 3 per cent. per annum be paid on the ordinary shares. This will absorb £3625, leaving £282 19s. 2d. to be carried forward.

Balance-Sheet, for the Half Year ending Dec. 31, 1877.

Dr.			Cr.		
Capital—			Concession	£7,000	0 0
5000 ordinary shares	£100,000	0 0	Investment to June, 1877	101,014	6 8
1000 10 per ct. preference shares	20,000	0 0	Additional during half year	371	11 4
1500 7½ ditto ditto	30,000	0 0	Freehold land to June	4,705	2 7
Creditors—			Additional during half year	338	10 0
On open accounts	1,870	8 1	Meters fixed	2,882	0 5
On acceptances	9,299	14 0	Office furniture and fixtures	364	10 2
Dividends unpaid	83	2 0	Preliminary expenses	16,914	17 3
Insurance-fund	47	4 10	Suspense account—		
Reserve-fund	3,000	0 0	Extension of retort-house, &c.	441	15 2
Profit and loss	3,907	19 2	Mains renewal	3,147	0 11
			Plant	511	14 8
			Amounts due for gas, fittings, &c.—		
			Public lamps	1,604	18 1
			Ditto establishments	4,024	2 6
			Private rental, fittings, &c.	6,737	10 2
			Sundry debtors	777	4 7
			Stock—		
			Coals	3,979	17 9
			Coke	36	0 0
			Fittings	3,275	14 5
			Sundries	2,490	4 6
			Goods in transit	3,350	3 4
			Bills receivable	2,000	0 0
			Cash at bankers—		
			General account	287	17 1
			Dividend account	83	2 0
			Bahia	526	7 7
			London office	9	14 0
			Bahia office	1,324	3 11
	£168,208	8 1		£168,208	8 1

Revenue Account.

Coals carbonized	£5,849	0 9	Gas supplied to public lamps	£9,702	2 8
Purifying materials and wages	222	3 11	Less fines	233	8 1
Carbonizing wages	1,214	15 2		£9,478	14 7
Wages, yardmen, &c.	234	10 0	Private consumers	6,282	19 10
Repairs, mains, and services	959	4 5	Public establishments	1,383	9 10
Lighting and repairing of public lamps	1,533	2 4	Meter-rental	333	4 4
Salaries	1,871	9 10	Products £1,900 18 6		
Directors fees	400	0 0	Less labour 81 19 2		
Auditors fees	21	0 0		1,818	19 4
Rent and taxes	177	9 10	Transfer fees	1	9 6
Interest	192	3 3	Profit on fittings	475	17 4
Stationery	72	18 0			
Office expenses	35	1 2			
Trade charges	150	7 3			
Wear and tear	1,314	17 4			
Bad debts and allowances	176	9 0			
Law charges	7	2 6			
Exchange	229	9 2			
Extraordinary disbursements—					
Extension of retort-house— £1,078 19s. 6d. (last instalment)	179	18 7			
£1,274 16s. 3d. (5th instalment)	212	9 5			
£687 17s. 9d. (4th instalment)	114	12 11			
Renewal of mains— £585 16s. 5d. (3rd instalment)	97	12 8			
£3,424 19s. 0d. (1st instalment)	570	16 6			
Renewal of plant— £739 9s. 4d. (3rd instalment)	123	4 10			
Defalcation suspense account	400	0 0			
Balance—profit	3,624	18 5			
	£19,974	14 9		£19,974	14 9

Profit and Loss Account.

Dividend declared Nov. 27, 1877	£3,625	0 0	Balance of account to June 30, 1877	£4,408	0 9
Reserve-fund	500	0 0	Revenue account, net profit for the half year ending Dec. 31	3,624	18 5
Balance	3,907	19 2		£8,032	19 2
	£8,032	19 2	Balance	£3,907	19 2

The Chairman, in moving the adoption of the report, said he much regretted the absence of Mr. Edward Horner, the Chairman of the Company, who was not at the present time in England. Referring to the balance-sheet, he said the gas-rental for the half year had been, on the whole, £928 18s. 2d. less than in the corresponding half year. The rental from private consumers was £424 less, and from public establishments £81 18s. 8d. less. The only item on that side showing an increase was the "Public lamps," which were £179 more. The Directors very much regretted this falling off in the rental, especially from private consumers. They had, on several occasions, directed the attention of their Manager at Bahia to it, but, he was sorry to say, had never received what they considered a satisfactory explanation. The expenditure on coals, though 137 tons more had been carbonized, was £701 less—the average price for the half year being 34s. 5d., as against £2 0s. 1d. for the corresponding half year, showing a difference in favour of the present half year of 5s. 8d. "Carbonizing wages" were £112 less, and "Purifying" £110 less. The saving on the "Coal carbonized," "Purifying material and wages," and "Carbonizing wages," was £923. Another item which had very much increased on the side of expenditure was "Repairs to mains and services," which this half year stood at £959 4s. 5d., as against £369 19s. in the corresponding period. This had arisen from the relaying of the services

as they took up the mains; but as those services were no doubt in a very bad state, and a fruitful source of leakage, it was a very judicious expenditure. The other items in the account called for no particular observation. The extraordinary disbursements for the half year were £83 less; but there was one item, called "Defalcation suspense account," which appeared for the first time, and £400 had been written off towards the £2000 referred to in the report. The working had not been so good as they had a right to expect, but for all that the profit for the year was greater than in the corresponding one, if the extraordinary items were taken into account. The profit for the year was £3624 18s. 5d., and, adding the £400 and £590 for extra repairs, a gross total was shown of £4416 18s. 5d., as against the gross profit in the corresponding period of £3919. He had now to refer to a very unfortunate affair—the defalcation at Bahia. This defalcation was discovered in the London office by the Secretary. On comparing the balances reported to be at the bank and in hand on the 31st of December, and the balance on the following day, the 1st of January, a remarkable discrepancy of £1200 appeared. The attention of the Directors was drawn to this, and they immediately telegraphed to the Manager at Bahia. The Manager was taken completely by surprise, and the first telegram in reply was not very satisfactory. A second telegram stated that it was a defalcation, and not an error, and named the defaulter. The whole matter was so unsatisfactory, that the Directors lost no time in appointing a competent person to go out to make a searching examination of everything. Fortunately their late Manager, Mr. Kilkeary, at that time was not much engaged, and he was sent out at a few days notice. The Directors were awaiting his report before they could state definitely what would be the exact amount of the defalcation, and how it had occurred. Another thing which had occupied the attention of the Directors was the unsatisfactory working, shown by the diminished rental at Bahia for the last two and a half years. The gross rental per ton in the half year ending the 31st of December, 1875, was £6 3s.; for the half year ending June, 1876, £5 16s. 11d.; December, 1876, £5 7s.; June, 1877, £5 5s.; and December, 1877, £5 0s. 9d., showing a gradual decrease in five successive half years. The products, also, during the same period, had greatly diminished, from 13s. down to 10s. 7d. a ton. All these matters together induced the Directors to send out a gentleman, at considerable cost, to make a thorough investigation into the whole of the working of the Company, and to go, if possible, through all the meters. He (the Chairman) was satisfied, as an old gas man, that with honest management at Bahia their Company would be a good paying concern; they merely wanted energy and honesty. The Company, unfortunately, never seemed to be able to get into smooth water, for as soon as they got over one difficulty another arose. He believed, however, by getting a proper Manager, affairs would be improved. He believed their present Manager at Bahia was honest, but still he had not done what he ought to have done, because, if he had, this defalcation could not have occurred. He (the Chairman) had been a Shareholder in the Company for 16 years, and had seen its various vicissitudes. It began wrong with a very heavy capital, burdened with an awful amount of preliminary expenses, but, for all that, he believed there was great vitality in it. He had no hesitation in saying that, with a little patience and a little different management at Bahia, it would go right, and the Shareholders would receive very much better dividends than they had hitherto done.

Mr. CLARKE seconded the motion for the adoption of the report.

The CHAIRMAN, in answer to a question from a Shareholder, said that the servants of the Company now at Bahia were not elected by the present Board, and no security seemed to have been taken.

Mr. FINLAY said they had security with the Manager for £1000. The other officers were in their places when the Board came into possession; no security had been given with them previously, and that arrangement had not been disturbed. He believed from that day that every officer in connection with the Company should give security.

The CHAIRMAN said the Board had taken security from every person appointed by them. The present defaulter was an Englishman, engaged in England by advertisement, and he was recommended as "in every way suitable, and thoroughly honest and reliable."

Mr. YOULE said he knew a great deal of Brazil, and he believed the great want of the Company was to have some gentleman on the Board who had a thorough acquaintance with Brazil. He knew other Companies where they had the benefit of such assistance. The Rio de Janiero Gas Company owed its success mainly to Mr. James. That was a Brazilian Company brought out for £6000, and now it had doubled its capital. When they first commenced no one would use gas, but Mr. James was able to induce the private residents to consume gas. What they wanted, therefore, was to appoint some gentleman to assist the Manager, who was well acquainted with the country, and would induce the public to consume gas. He felt it was impossible to strengthen the Board as a Gas Board, but looking to the Company as a commercial concern, he believed it would be an advantage if some gentleman were placed upon the Board who had an intimate acquaintance with Brazil.

The CHAIRMAN said unfortunately for the Company they had no Brazilian Shareholders at Bahia. They had been negotiating with a gentleman who had intimate commercial connection with Brazil, to see if they could appoint a gentleman to look after the concern, more as an Auditor, and they hoped to be able to appoint some one of that description. It was not that the Board so much required advice at London, but what was wanted was a sort of Inspector at Bahia.

Mr. FINLAY said it was only fair to say they had an interview with Mr. James at the Board, and would have been very pleased to see him there. They should only be too glad if any gentleman connected with the Brazils would take a seat at the Board, and give them that assistance they might possibly stand in need of.

Mr. YOULE said he did not think a gentleman at Brazil would take the position, because it would be impossible for a merchant, or any one engaged in business, to devote his time to the Gas Company. What was required was a gentleman on the Board who was acquainted with Bahia, and a clerk out there who knew the country well. He knew very well that Mr. James was so thoroughly occupied that he could not possibly give his time to attend the Board, but probably there would be no difficulty in finding other gentlemen of experience who would join if necessary.

Mr. FOGG suggested the appointment of a Local Committee, who would, no doubt, for a nominal sum, superintend the finances over there.

The CHAIRMAN said they had no Shareholders at Bahia, and a Local Committee must consist of Shareholders. They could, of course, appoint an Auditor who was not a Shareholder.

Mr. FINLAY said an auditor would be able to keep a thorough check upon the finances. There were also other matters. The loss of gas had been something like 30 per cent. of the total make, and if that could be reduced one-half it would tell a very handsome tale. He did not wish, at that stage of the proceedings, to introduce the name of any individual, but it did appear that certain persons in Bahia had been greatly to blame. The Directors had sent out everything they had been requested to—main-pipes, and all materials for reducing the leakage—but up to the present moment there was very little improvement. It seemed as if they wanted some one to take the management of the works as well as the management of the finances. For his own part, he believed that the leakage had not all taken place from the pipes.

The CHAIRMAN said, if Mr. Youle could recommend any gentleman to join the Board, the Directors would be very glad to entertain the proposition.

The resolution for the adoption of the report was then agreed to.

On the motion of the CHAIRMAN, a dividend for the half year at the rate of 10 per cent. on the 10 per cent. preference capital, 7½ per cent. on the 7½ per cent. capital, and 3 per cent. per annum on the ordinary capital, less income-tax, was declared.

On the motion of Mr. YOULE, a vote of thanks was passed to the Chairman and Directors.

A vote of thanks to the Secretary (Mr. A. J. Head) was proposed by Mr. S. P. BOSTOCK, and having been adopted, the proceedings terminated.

MONTE VIDEO GAS COMPANY, LIMITED.

The Sixth Ordinary General Meeting of Shareholders of this Company was held on Thursday, May 30, at the City Terminus Hotel—Mr. J. BRAMLEY-MOORE, presiding.

The SECRETARY (Mr. J. T. Denniston) read the advertisement convening the meeting, and the minutes of the last meeting, which were approved.

The following report of the Directors was taken as read:—

The Directors submit to the Shareholders the annexed statement of accounts for the year ending Dec. 31, 1877.

The progressive increase of the Company's business has been in some degree arrested during the period of commercial depression which has characterized the past year; the results, however, may be considered satisfactory under such circumstances.

The net profit on the year's working amounts to £49,388 11s. 4d., out of which the Board have passed £6000 to contingency-fund, which is thus raised to £31,000.

The balance remaining at the credit of profit and loss account—adding that brought forward from 1876—amounts to £43,896 2s. 5d., which sum will become available for dividend when received.

The Directors, for the present, are compelled to postpone the recommendation of a dividend, owing to the continued delay in the payment, by the Government of Monte Video, for public lighting; they are glad, however, to say that arrangements have been recently completed for the recovery of the whole amount outstanding, for which Treasury bills have been received. The Directors feel indebted to the Governor of Monte Video and his Ministers for the cordial manner in which they have met the wishes of the Board, and arrangements are now being concluded with the Government which will facilitate the collection of public lighting accounts, and, they hope, permit, at no distant date, of regularity in the payment of dividends, which the Directors have been anxiously striving to secure.

The Directors who retire by rotation are H. E. Visconde de Maud and Alexander K. Mackinnon, Esq., who, being eligible, offer themselves for re-election.

The retiring Auditors, Messrs. Price, Waterhouse, and Co. and John Cater., Esq., offer themselves for re-election.

Balance-Sheet, Dec. 31, 1877.

Cr.				Dr.			
Capital authorized—				Cost of gas-works, mains, concession, plant, dock, and sundries, as per balance-sheet, Dec. 31, 1876, including meters . .			
30,000 shares of £20 each	£600,000	0	0		£542,020	8	4
2,904 do. £20 do. unissued.	58,080	0	0	Add expenditure during 1877, as follows:—			
27,096 do. £20 do., fully paid and issued to date . .	£541,920	0	0	Extensions at gas-works .	1,094	16	10
Contingency-fund. . . .	25,000	0	0	New mains	668	8	4
Amount carried to fund this year	6,000	0	0	Do. services	682	10	2
Sundry creditors, London .	14,125	9	2	Do. meters	149	7	3
Ditto, Monte Video . . .	668	15	0	Dock, new deposit, finishing new pier, and other works	650	0	0
Bills payable	3,370	17	3	Dock workshops and machinery	1,033	16	2
Dividends unpaid . . .	7,862	8	0				
Profit and loss account—				Total capital expenditure .	£546,299	7	1
Balance, Dec. 31, 1876 . . .	£22,184	4	1	Stock of coals at cost. . .	5,708	6	8
Deduct dividend paid Dec. 28, 1877 . . .	21,676	16	0	Do. gas-fittings	7,082	14	9
	£507	8	1	Do. residuary products .	1,143	6	7
Profit for 1877, from revenue account . .	49,388	11	4	Do. materials in store for use	6,013	3	0
	£49,896	2	5	Do. ditto sale	1,625	11	3
Deduct amount carried to contingency-fund this year . .	6,000	0	0	Sundry debtors, gas consumers at Monte Video .	48,110	11	2
				Furniture in London and Monte Video	1,094	5	2
Balance	43,896	2	5	Acceptances in hand at Monte Video	3,272	18	3
				Bills receivable in transit .	10,000	0	0
				Cash at Monte Video. . .	171	13	1
				Ditto London	9,751	4	3
				Goods awaiting shipment and afloat	2,677	4	7
	£642,813	11	10		£642,813	11	10

Revenue Account.

Cost of manufacture and expenses at Monte Video after making provision for bad and doubtful debts . .	£46,376	19	8	Sales of gas, residuary products, rent of meters, sale of gas-fittings, &c. . .	£93,130	1	5
Directors fees, salaries, and London expenses . . .	2,499	7	4	Revenue from dock and workshops	4,041	18	10
Income-tax	526	19	3	Interest account – balance .	1,504	6	4
Balance, being profit for the year	49,388	11	4	Transfer fees	25	5	0
	£98,791	11	7		£98,791	11	7

The CHAIRMAN said: Gentlemen, I can only say that we regret to meet you very much in the same condition as last year in regard to your dividend—that, although you will have a dividend, it will be deferred as on the former occasion; yet, on the whole, I think that the report we offer to you will be received as satisfactory. It will be satisfactory in so far that several alterations have been made by your Directors, and arrangements have been made with the Government, with the view to secure to you regular dividends at, I hope, no very distant period, and the way this has been accomplished and brought about is this: You are very well aware of the debt which the Government owe the Company, and that they were in arrear with the payment. That, in truth, was the only cause why the dividends have not been paid more punctually before. Your Directors have made arrangements with the Government to settle up all the old arrears, and in doing so they have taken bills, accepted by the Government, for the whole of the arrears, covering a period which, under the circumstances and conditions of the finance of the country, is favourable to the Company. They are now bound to pay us 4000 dollars a month—hard dollars—and, so far, this amount has been punctually paid, and there is no reason to doubt that it will be so in future. The trade of the River Plate has been improving for some time, and there is a very marked improvement, particularly in Buenos Ayres, to what it was some ten or twelve months ago; and an improvement taking place up the river is always followed by an improvement down. We may, therefore, look for—indeed, we know, that things have considerably improved in Monte Video, and there is every reason to hope that things will go on improving in future; and, therefore, with these payments and our incoming money at a future time—I do not pretend to prophesy—I hope your dividends will be paid regularly half yearly, and that you will not be obliged to wait. To make this more secure, an arrangement has been entered into with the Government respecting the taxing. That taxing has been

agreed on; and on the 24th of this month we received the following telegram:—"Governor promises tax this month." Now, the Government have been so occupied that the thing was not finally settled as far as the decree went; but the arrangement is made, and, therefore, this will be an additional security to you as to forthcoming dividends being more regularly paid in future. Another point has interfered with the Government—their anxiety and the precautionary measures they are engaged in at the present moment about the yellow fever. That had broken out, and occupied a great deal of their time, and to this is attributed the principal cause of the delay in passing the decree. We know that they are very much occupied, and have a great many difficulties to contend with, and every indulgence and allowance ought to be made. I must say, at the same time, with great confidence, that the President of the Republic has shown himself to be a zealous and true patriot in reducing the charges on the country in every way he could, and in being as punctual as possible in the payments. He is a man highly esteemed, very influential, and has in every way that he could, as far as his means allowed, facilitated the arrangements with this Company. You will see by the accounts that the profits are apparently £3000 less than they were a year before; but this is so far made up in other ways that there is no reason whatever why your dividends should be diminished, and, therefore, we can offer to you, as soon as the money is received, the usual dividend of 4 per cent. for the half year. I now come to a subject that is not quite so agreeable—the disappointment we have in the dock; but this may be easily accounted for, although not satisfactorily, according to our anticipations. The trade in shipping has been so bad, and has fallen off so much, as to interfere very materially with the income of the docks. At the same time, I must say that you cannot take the past year as a fair criterion of what you may hope for in the future. Trade has been very much depressed, shipping has suffered very much also, and, therefore, that accounts for the position of the docks not being so favourable as we anticipated on a former occasion. The revenue of the docks is £500 less than it was a year ago, instead of being, as we ought to look forward to, an increase. I am sorry to say that this is the case. I have one other circumstance to mention, as we always take you fully into our confidence, and withhold no secrets from you connected with the Company. We have had the misfortune to receive a remittance in a bill which has not been honoured. It is a bill for £4000, but we are assured from the other side that there will be a dividend of from 8s. to 10s. in the pound, and that the parties who have failed have very small liabilities, and have assets to make that dividend. There has been a great difficulty in getting good bills, and very few of the banks would draw. All the banks there have been very much crippled, and it has been one of our greatest difficulties to secure good bills for our remittances. I am not aware that there is any other circumstance to bring before your notice, but if any Proprietor has any question to put to me, I shall be very happy to give him all the information in my power. With these remarks, I beg to move—"That the report be received and adopted."

Mr. Frederick Youle, a Director, seconded the resolution.

Mr. Micholls said the Shareholders were informed that the Company had received Treasury bills, and it struck him very forcibly that a Company meeting its engagements quickly made it appear really what he considered this was—a strong Company, and on that principle he thought it was the aim of the Shareholders to get the money distributed. One remark which had fallen from the Chairman was not at all surprising to him (the speaker)—he referred to the observation about the dock. He had some knowledge of Buenos Ayres, and when he first embarked in this concern, he made an inquiry of a very clever man, a large merchant, and a resident there, who said, "Condemn the dock," and he had done so. He thought that every trade should be kept to itself. "Let the shoemaker keep to his last." Gas property and dock property were two very different things; and he suggested that if the dock property was worth anything, it should be put in the market. They did not want a dock; they wanted to make profits by one particular thing—by the production of gas. He made these remarks in no captious spirit, but to aid in the government of the Company. He had not differed in his opinion from the beginning—that a dock should never be in the possession of a Gas Company. It had been farmed in some way on the Company, and he contended that they should dispose of it.

Mr. Unwick advocated the separation of the accounts, as to the capital expended on the gas-works and that on the docks, and then they could judge how they were doing. If the dock was useless, the sooner they got rid of it the better. He thought that it was a great misfortune that no dividend had been paid to them. From what he could gather, they ought to have been paid the November dividend. In December, according to the balance-sheet, they had a balance of £9922, and bills in transit £10,000, and that day they were informed that they had Treasury bills on the Government, who had been paying them off at the rate of 4000 dollars a month. He therefore thought that the dividends ought to be paid, so as to maintain their capital. They had been getting gradually worse in the matter of dividends, and he did not like to see his shares gradually going down. Referring to the question of coal in stock, he thought that while coal was cheap they should have a good stock, but he found it had been diminished to the extent of £5000 as compared with December, 1876.

Colonel Robinson pointed out that the Chairman had spoken of a dividend of 4 per cent. for the half year, but they were reviewing the accounts of the whole year.

Mr. Byfield asked what amount had been received from the private consumption, for some information respecting the taxing to which the Chairman had referred, the amount of profit the Company had received on the working of the dock in the past year, and the amount of Treasury bills received.

The Chairman, in reply, at the close of the discussion, said the Treasury bills which the Company had received from the Government covered a period of four years. With regard to discounting them, this was a point which would never escape the attention of the Board. They had not only discussed the subject of discounting the bills, but of bringing them to England to discount them. It was a very difficult matter to bring bills of a distant country to discount in London. The rate was so onerous at Monte Video that it really was out of the question to do them there, and, if any, they could only do a portion of them. The rate of interest there for discount would be, at the very least, 12 per cent., so that he thought they would excuse the Directors from incurring such a liability, and particularly when these payments were coming in; and they hoped they would continue to do so, and be punctually paid. The amount of bills received was 190,000 dollars. As to taking nothing but bank bills for remittances, so far from the parties to whom he had alluded being considered of a doubtful character, one of the banks held £23,000 of bills belonging to the house of which this Company had the misfortune to hold one for £4000. This would indicate to them the credit in which the house was held. They could not expect to get scot free in these transactions, considering the times that they had been passing through. This was the first loss they had sustained, and he hoped, now that things were improving, that they would have no more. With regard to the dock, this was a very important matter, on which great stress had been laid. It was only after very grave and mature consideration that the Directors consented to take it at all, and then at a considerable reduction from the value which was put on it; but the utility of the dock was very great indeed, and without it the Company would have to incur a good deal more expense for coal. Now they had the certainty of discharging and getting their freights lower, and their coal on better terms, than if the dock did not belong to them. The net profit of the dock for the past year was £2600, the item of £4041 in the revenue account being the gross. But the dock formed part and parcel of their property. Its cost, he believed, was £111,000, a good deal of which was invested in machinery, and the net amount realized in the past year would be about 2¼ per cent. He should certainly not advise its been sold, and parties well acquainted with the trade of the port would not countenance any such measure. The dock adjoined their works, of which, as he had said, it was part and parcel, and therefore in keeping it along with their gas-works they were "sticking to their last." As to their coal, they had entered into a contract. Those acquainted with a climate such as South America were well aware that large stocks of coal could not be kept without deteriorating very considerably. What they had done to meet this contingency was that they had entered into a contract here for coal to be taken over so many months at a fixed price, which was much better than laying out £30,000 or £40,000 on a large stock of coals, which would be depreciating and deteriorating day by day from the effects of such a climate. This contract was now about to expire, and he need not tell them that this was a very favourable time to enter into a new one. This was now under the consideration of the Board, and it would be a great deal better to make a contract here to cover the requirements of the Company for the next six months than at once send out six months supply. The gross income in the past year from the private consumers was £52,437, and from the public lighting £26,417. The meaning of the taxing was this—it was transferring it from one party to another. Instead of being troubled, and the Government being always in arrear with their payments, it meant that this tax on the Government would be transferred to the consumer, which would make it much more secure to the Company than as it now stood. With regard to Colonel Robinson's remarks, the dividend was divided in the usual way, for the two half years, and there was sufficient to pay at the rate of 8 per cent. for the year.

Mr. Micholls said he had not suggested that the bills should be discounted on the other side, for he knew the usurious interest there; but, as they were in possession of the Company, they might be discounted in this country, and he believed they could be done here at no great rate.

The Chairman said that they would be most happy to offer them to Mr. Micholls on very favourable terms.

Mr. Micholls observed that he was not a dealer in bills. With regard to the docks, if it was contended that a dock was a necessary adjunct to a good Gas Company, let them look at the Rio Gas Company, which was admirably well managed, but had no dock. The best way in which to get their coal cheap was not to have a dock, but to go to A., B., or C., and see who would give them the lowest terms. He again urged the advisability of disposing of the dock.

Mr. Unwick repeated that he considered that they ought to have had a dividend, for the accounts showed that they had £19,000 in hand on the 31st of December last.

The Chairman said the last speaker had looked at only one side of the accounts. The £10,000 on the credit side was in transit, and they had, therefore, taken credit for it in the account, and in anticipation of it had borrowed £14,000 from their bankers. He forgot to mention that Mr. Bartlett James, one of their Directors, and also an old Director of the Rio Gas Company, had gone out to Rio, and he would go down to Monte Video, and see if any improvements and alterations could be made in their Company; and he had no doubt that his services there would be very valuable to them, for he was well known there; he was a man of excellent judgment, and he was thoroughly up in the manufacture of gas from beginning to end. He had no doubt whatever that Mr. James would render an account which would be satisfactory to the Proprietors.

Mr. James agreed in the advisability of purchasing coal here on contract. With regard to the renewal of the contract which they had heard was about to expire, he should be glad to see it renewed, on the present terms, for twelve months. He could quite understand that the possession of the dock gave them advantages which they would not otherwise have.

The Chairman said that they would make the best arrangement they could in renewing the contract for coal, but there were two parties to every bargain. The Board would be happy to accept a contract for coal for twelve months if they could find a coal proprietor to take it. He thought this matter might be safely left in the hands of the Directors. He then put the motion for the reception and adoption of the report.

Colonel Robinson said he objected to the approval of the report, for he saw nothing to approve. They were owed twelve months dividend, and they could get nothing.

The motion was carried with one dissentient.

The Chairman then moved the re-election as Directors of the Visconde de Mauá and Mr. A. K. Mackinnon.

Mr. Youle seconded the motion.

Mr. Micholls wanted to know whether they were to have the same direction year after year. An infusion of new blood was frequently advantageous.

The Chairman said the matter was entirely in the hands of the Shareholders, who elected the Directors, and if they did not conduct the business of the Company to the Shareholders satisfaction, and it was their pleasure to put new men on the Board, they could do so whenever they pleased. Although the Directors felt the honour and confidence reposed in them, they would offer no objection to whatever the Shareholders brought forward.

The retiring Directors were duly re-elected.

On the motion of Mr. Ohren, seconded by Mr. J. H. James, the retiring auditors—Messrs. Price, Waterhouse, and Co., and Mr. John Cater—were re-elected.

Mr. Clements, the Solicitor, in reply to a question, said the Directors had the power to call a meeting at any time, and directly the money was in hand they would call a *pro formâ* meeting to declare a dividend.

The Chairman also said, in reply to the same question, that as soon as ever they received the money, they would call a meeting and pay the Shareholders a dividend.

Mr. Byfield then referred to the visit to Rio of Mr. Bartlett James, who intended also to go on to Monte Video. He had no doubt that the visit of that gentleman would be followed by advantageous results.

Mr. J. H. James proposed, and Mr. Widekend seconded, a vote of thanks to the Chairman and Directors, which was passed.

The Chairman, in reply, said: I beg to offer you my thanks and the thanks of my colleagues for the confidence you have reposed in us. I can assure you that your affairs have had the most careful attention of the Board, and that they will continue to receive them in the future. In a Company like this—indeed, in almost any Company—there may be some matters requiring explanation, and all I can say is that, to the best of our ability, we shall be happy to explain them at any time. Any gentleman wishing information shall have it furnished him, if he will kindly take the trouble to go to the office.

The proceedings then terminated.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

With the commencement of this month there has been a drop in prices in the Manchester district, ranging from 6d. to 10d. per ton on all classes of fuel, and generally throughout Lancashire there is a downward movement in values, for, although list rates nominally are unchanged, there is underselling in every direction, and in nearly every case reductions are made rather than miss orders. The gas coal contracts are still competed for at very low figures, and the business doing in this branch of trade is generally of a very unsatisfactory character, so far as colliery proprietors are concerned; but there are some who are holding back in the hope that, as the season advances, and the low sellers have contracted for their output, better prices will be obtainable. Other classes of fuel remain in much the same position as last reported, house coal, steam and forge coal, and engine fuel being very bad to sell, the strike in the cotton trade still throwing large quantities of the last-named description of fuel upon the market. Short time is generally being worked at the pits, and some of them in the neighbourhood of North-East Lancashire are not running more than three days a week. The average quotations at the pit mouth may be given at 9s. to 10s. per ton for good Wigan Arley for house-fire purposes, 7s. 6d. to 8s. 6d. for Arley for gas-making purposes, 6s. to 7s. for common gas coal, 7s. to 8s. for Pemberton four-feet, 5s. to 6s. for forge and steam coal, 4s. to 5s. for burgy, and 3s. to 4s. for slack.

The London and North-Western Railway Company's contracts for Lancashire steam coal for the ensuing twelve months have, I understand, been placed at prices averaging 5s. 6d. per ton at the pit.

The strike of miners in the Oldham district has terminated by the men going in at the reduction in wages.

The iron trade is still without improvement, and there is no material change to notice since last week. There is still very little doing either in raw or finished iron, and prices nominally are unaltered; but there is a great deal of pushing at low figures in the market.

Works are all very slack, and founders in North-East Lancashire are almost stopped in consequence of the cotton strike.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

Since the prospects of peace have brightened, there has been more activity in shipping movements in the coal trade of the North. All kinds of freights are lower, but the fall has been least in coal freights. To London the rate is 4s. 3d. for steamers, and from 5s. 1½d. to 5s. 3d. for sailing vessels, the latter to deliver coals at the gas wharves below London Bridge; Havre, 6s., steamers; Rouen, 7s. to 7s. 6d.; Dublin, 7s. per ton. In nearly all those quotations the cargoes are gas coals.

The shipments of best gas coals are the ordinary average for the season. About 29,000 chaldrons, a good deal of which would be gas coals, were shipped from the Tyne Dock last week. Best gas coal maintains a rate of about 7s. per ton. Second-class gas are not much in demand. The colliery offices have to make their own bargains, and, as a rule, second-class pits in the county of Durham do not exceed half time. The steam collieries of Northumberland continue to be fairly well employed, but prices are a little weaker. Small coals are at a ridiculously low price. They are delivered free on board ship at the Tyne Dock, at from 2s. 3d. to 2s. 6d. per ton. This, of course, includes railway charges.

The chemical and iron markets were dull during last week. The chemical trade was weaker, and prices, low as they had been previously, tended downward. In the iron market common bars sold at £5 10s.; merchants bars, £9 per ton. In the chemical market crystals of soda were as low as £3 per ton, less 3 per cent. discount. Pig lead was selling at £17; dry white lead at £24; red lead at £18 15s. per ton. Copper, flat cake and ingot, £66 to £68; best selected, £72 per ton.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Dr. Wallace's report on the quality of the Glasgow gas supply for the week ending the 25th of May shows that the minimum illuminating power of the gas ranged from 25·48 candles in the western district, to 26·66 candles in the eastern and central districts, while in no instance did the maximum exceed 27·66 candles, or an average of 26·88 candles. The lowest results over the week were those of the western district.

On the 25th ult. the Glasgow Corporation Water Annuities were higher, at 100 for the £4 distribution, and on Wednesday last they were £1 higher, at 101.

The Perth Corporation Water-Works Commissioners are about to proceed with the execution of the important works provided for by the Act of Parliament obtained last session, including the construction of two large reservoirs (one of which is to be covered), one at the Town's Muir, and the other at Viewlands, and laying down lines of piping, &c.

On Thursday last the town of Bathgate held high holiday, on the occasion of the opening of the new water-works, which have been in progress for some time. In the new works there are embraced a large storeage reservoir, capable of containing 105 days supply, being sufficient to guarantee a supply of 80,000 gallons per day; two filters, capable, together, of filtering over 120,000 gallons per day; and a covered tank, capable of holding upwards of 56,000 gallons. Messrs. Leslie, Edinburgh, were the Engineers, and the cost of the whole operations will not exceed the original estimate of £6000.

The Board of Supervision have recommended to the Public Works Loan Commissioners to grant the necessary funds for providing a supply of water to the village of Auchmull, in Aberdeenshire. At one time it was proposed to include the villages of Bankhead and Woodend with that of Auchmull, but there were great difficulties in the way to prevent the proposal being carried out, the chief being the distance between the villages.

An important drainage scheme for the town of Selkirk is at present being carried out, the first portion of which is nearly finished, and the second contract has just been settled. The total cost of both contracts will be about £4000, exclusive of "extras." The sewage is to be used in irrigating a tract of haugh land at the side of the River Ettrick.

A very valuable report upon the disposal of the sewage in various towns throughout England has just been presented to the Barony Parochial Board, the Local Authority for a large portion of the northern suburbs of Glasgow, through which the Possil Burn runs in its course to the Clyde. The reporters recommend that the Board should, in conjunction with the City and other Local Authorities, apply for a suspension of the powers of the Rivers Pollution Prevention Act for a limited period, while they endeavour to agree on a joint scheme for which parliamentary powers may be asked in the next or some early session of Parliament. In the meantime the consideration of the report is delayed.

There was a good deal of improvement in the Glasgow pig iron market during the past week, the closing price on Friday being 8½d. per ton better than on the previous Friday.

The coal market continues to be very dull, and without any notable change or prospect of improvement.

INSTITUTION OF CIVIL ENGINEERS.—At the monthly ballot, on the 28th ult., Mr. Charles Horsley, of Wharf Road, City Road, London, and Mr. John Macnie, of the Londonderry Gas Company, were elected as Associates.

SALES OF PROVINCIAL GAS SHARES.—On Friday, the 24th ult., 105 paid up £25 shares in the Epsom and Ewell Gas Company were sold at the Auction Mart for £3125, or at rather more than £4 15s. per share premium. At the Royal Hotel, Wakefield, on the 31st ult., 120 £5 B-5th shares, fully paid, in the Wakefield Gas Company, sold at £8 and £8 7s. 6d. each.

WATER SUPPLY OF CHRISTCHURCH (N.Z.).—A Committee appointed by the Christchurch (New Zealand) City Council to consider the question of the water supply of the town have agreed to the conditions which the competitive plans for a water supply must fulfil. These conditions are, that every scheme of water supply must provide for a daily consumption of not less than 1,000,000 gallons; that the maximum cost of any scheme must not be more than £100,000; and that the minimum force of water must be equal to throwing a jet of water 100 feet high from a 1-inch pipe. These conditions have still to be submitted to the Christchurch City Council for approval.

LIVERPOOL GAS-FITTINGS COMPANY.—The annual meeting was held on the 21st inst.—Mr. Thompson in the chair. The report of the Directors stated that the profit on the year's working was £1021 13s. 2d., which added to the sum of £636 4s. 9d., the balance from last year, left the sum of £1657 17s. 11d. to the credit of profit and loss account. The Directors recommended that a dividend be declared for the year, at the rate of 10 per cent. (free of income-tax), leaving a balance of £657 17s. 11d. to be carried forward to next year's account. The report was adopted, and the dividend declared. Votes of thanks were passed to the Directors, and also to the Secretary and Manager, Mr. S. Haynes.

RIVERS POLLUTION ACT.—In the St. Albans County Court, on the 17th ult., the case of *Woollam v. The Corporation of St. Albans*, for polluting the River Ver, came again before Judge Wigham in the form of an application made by Mr. Dunville, Deputy Clerk of the Peace for Hertfordshire, on behalf of the plaintiff, for an order that defendants should pay £50 a day for every day during which the defendants were in default in complying with the requirement of the order of the court dated Oct. 26, 1877. At the April sitting a further extension of time for six months was allowed, but to this the plaintiff now objected, and asked for the imposition of a fine within two months. The Judge imposed a fine of £25, but gave liberty to the defendants to apply for rescindment on the 9th of August, on proof being given that all due care and despatch have been used in the preparation of a scheme to prevent continuation of the offence, and that such scheme will be carried out without delay.

MILTON NEXT SITTINGBOURNE GAS SUPPLY.—At the meeting of the Milton Improvement Commissioners on the 8th inst., a report was read from Mr. Pike, Manager of the gas works, showing the increase in the manufacture of gas. From this it appeared that the amount of gas made in the year 1877–8 was 4,608,600 cubic feet, against 2,946,900 in 1876–7; coal used, 553¾ against 360¼ tons; lime used, 39 against 26 loads; coke sold, 152 against 136 chaldrons; tar sold, 87 against 62 barrels; public lamps lighted, 1407½ hours against 1666 hours; amount paid in wages, £240 3s. 3½d. against £179 11s. 6d. During the week ending April 29, 1878, 81,000 cubic feet of gas were made, against 42,700 in the corresponding week of the previous year. The Manager added that if the increase still continued something would have to be done to meet the wants of the consumers. The question of extending the gas-works was referred to the Gas Committee, to consider and to report upon at a future meeting.

EPSOM AND EWELL GAS COMPANY.—The *Sutton and Epsom Advertiser* says "The works of this Company have been for two years under the management of Mr. Robert Jones, C.E., Engineer to the Commercial Gas Company, and a Member of the Metropolitan Board of Works, assisted by his son, Mr. H. E. Jones, C.E., also of the Commercial; and the Directors and their Chairman, J. H. Puleston, Esq., M.P., may, we think, congratulate themselves and the proprietary on the conversion of a property, which a short time ago paid no dividend, into one of the value evidenced by the prices realized at the late sale. The price of gas per 1000 is now 5s. 10d. The property having so considerably increased in value, it would be well if the Managers could see their way to allowing the consumers to participate in the benefit by lowering the price of gas. We understand that there is some probability that this determination will be arrived at. It will tend not only to gratify the consumers, but will probably prove financially advantageous to the Company."

DRONFIELD GAS COMPANY.—At the annual meeting on the 22nd ult., the Directors reported the continued success of the Company. There had been laid 720 yards of new mains during the last year, and 200 yards more were awaiting the permission of the Local Board to be laid. The leakage had again occupied the attention of the Directors, and after much anxiety and expense they had been able to reduce the waste from 35 to nearly 10 per cent. The Directors were glad to be able to intimate that they had reduced the price of gas 10d. per 1000 cubic feet, and, at the same time, added 28 consumers to the list of customers. They hoped that during the coming year the public of Dronfield would avail themselves of the privilege of using gas more generally, so as to enable the Directors to still further reduce the price to the consumers. The 800 new £15 shares (equal to £12,000) of 1877 had all been issued. Should the public require further extensions, another call would be necessary, to enable the Directors to meet the wishes of the inhabitants.

QUALITY OF THE NEWCASTLE-ON-TYNE GAS.—Mr. John Pattinson reports the following as the results of his examinations, for the last month, of the quality of the gas supplied to the borough by the Newcastle-on-Tyne and Gateshead Gas Company:—

Date, 1878.	Illuminating Power in Sperm Candles.	Grains of Sulphur in 100 Cubic Feet of Gas.	Sulphuretted Hydrogen.
May 3	14·0	6·34	Nil.
„ 7	15·4	5·82	„
„ 10	14·8	5·74	„
„ 14	15·7	5·73	„
„ 17	15·2	6·00	„
„ 21	15·4	5·94	„
„ 24	15·4	5·05	„
„ 28	15·0	6·32	„
„ 31	14·9	6·54	„

A Sugg-Letheby standard Argand burner and Wright's sulphur apparatus are used in testing. According to Act of Parliament, the gas should not be of less than 14 standard candles illuminating power, nor contain more than 17 grains of sulphur per 100 cubic feet of gas.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.—On Saturday, the 25th ult., the Members of this Institution, to the number of 30, paid a visit to Blackpool, and were received at the Corporation Gas-Works by Mr. Anderson, the Deputy-Chairman of the Gas Committee, and Mr. Chew, the Engineer, and conducted to the committee-room, where the drawings of the new works recently completed, and those now in progress, were arranged on the walls for their inspection. These works consist of

a set of six annular condensers, each 20 feet by 2 feet 9 inches; a pair of scrubbers, each 5 feet by 35 feet, adapted for ammoniacal liquor and fresh water respectively; a gasholder and tank, 80 feet by 20 feet, to hold 100,000 feet of gas; a gasholder and tank, 101 feet by 26 feet, to hold 210,000 feet of gas, with all the details of working drawings; and a new retort-house, with coal sidings and sheds, 140 feet by 60 feet, capable of holding 168 mouthpieces. The whole were critically examined by the various Engineers present, after which a general inspection of the works was made, including the apparatus for the manufacture of sulphate of ammonia and the distillation of tar. Many inquiries were made from Mr. Chew in reference to various parts of the plant, and much interest and satisfaction was expressed by the Engineers present.

Stealing Iron from the Halifax Corporation Gas-Works.—Three men—father and two sons—Jonathan, Samuel, and Frank Hainsworth, have been committed for trial by the Borough Magistrates, charged with stealing iron from the Halifax Corporation Gas-Works. The case against Samuel Hainsworth was heard first, the charge against him being that of stealing two bags of bolts and an iron elbow. The circumstances were these: The Gas-Works Committee accepted a tender sent in by the father for old iron at the works. This was to be weighed on being removed. Samuel Hainsworth caused the things mentioned to be removed in a cart which had taken bricks to the works, and they were not weighed. The bolts were among the things contracted for, but the iron elbow was not. The act was observed, and the carter was stopped before he had got far from the works. Prisoner was committed to the sessions, but bail was accepted, himself in £80, and two sureties in £30 each. All the three prisoners were then placed in the dock, Samuel and Frank for stealing, and their father, Jonathan, for receiving iron on the 3rd, 7th, and 8th of May. The chief witness was William Reed, a labourer, who, along with Samuel and Frank, helped to remove the iron from the gas-works to Hainsworth's yard, without it being weighed. Jonathan Hainsworth was present in the yard, it was proved, when the iron was being broken up. Prisoners were all committed for trial, but were admitted to bail, Samuel in his own surety of £80, and two others of £30 each; and the other prisoners each in £100, and two sureties of £50 each.

Highbridge Gas-Works.—These works, which have just been completed at a cost of £3500 were opened a week or two ago, and the event was celebrated by a public dinner and a great display of rejoicing throughout the town. The necessity of providing gas-works for Highbridge was long since talked of, and a Company was formed for the purpose eight years ago. The protracted delay which has since taken place is accounted for by the difficulties that have presented themselves with regard to the selection of a site, two which were purchased having been strongly objected to, on various grounds, and abandoned. This matter, however, having been overcome, the services of Mr. Dand, C.E., of Exeter, were called into requisition, and that gentleman's plans, &c., accepted, and Messrs. Willey and Co., of Exeter, were employed to carry out the engineering portion of the work, the contract for the building having been entered into with Mr. Press, of Burnham. The manner in which the works were planned and have been executed reflects great credit on all concerned, and several competent judges have pronounced them to be everything that can be desired. The works comprise ten retorts with 4-inch pipe connections; two condensers, 2 feet diameter by 10 feet; scrubber, 4½ feet by 12 feet; two purifiers, with 4-inch connections; and gasholder 40 feet diameter by 12 feet deep, with six columns and ornamental girders. The inlets and outlets of the gasholder are all 9-inch, whilst the delivery-pipe to the town is 6-inch. The meter and governor have also 6-inch connections. The buildings are of brick, with tile roofing—namely, retort-house, purifying and lime shed, and model-house. A commodious brick house has also been erected upon the premises for the Manager. In the evening of the day on which the works were opened the town was effectively illuminated.

Landing and Storeage of Petroleum.—At a meeting of the Civil and Mechanical Engineers Society on the 2nd of May—Mr. Henry Valpy, Memb. Inst. C.E., in the chair—a paper was read by Mr. William C. Street, Assoc. Inst. C.E., on "A Landing Pier and Concrete Warehouses at Thames Haven." The Thames Conservancy having prohibited the discharge of any oil giving off vapour under 100° Fahr., nearer London than Thames Haven, and the Metropolitan Board of Works having on more than one occasion referred to the danger occasioned to the inhabitants of the Metropolis by the storeage within its area of, on the average, over 50,000 barrels of petroleum, a Company was formed about two years ago for building warehouses with landing conveniences and railway communication at Thames Haven. The pier extends into the river about 250 feet, and there is a depth of water at low water spring tides of about 25 feet. The pier head is an iron structure 90 feet long by 30 feet wide, with every convenience for landing, and with rails laid upon it, having direct communication with the London, Tilbury, and Southend Railway, as well as to the warehouses. These last are 13 large concrete vaults, each 90 feet long by 20 feet wide, and 14 feet high, and capable of receiving about 1500 barrels each. These are considered as only a commencement, the intention being to build a much larger number, as the advantages offered are appreciated and the trade increases. The author described the details of the several works and the difficulties encountered in their construction. The Contractor was Mr. William Eckersley, Memb. Inst. C.E., and the works were executed under the superintendence of Mr. Brunlees, Vice-President of the Institution of Civil Engineers, as Consulting Engineer; Mr. Henry William Spratt, as Architect; and of the author of the paper (Mr. William Street) as Acting Engineer. An interesting discussion followed the reading of the paper, in which the President, Mr. H. E. Hill, Mr. R. M. Bancroft, Mr. A. P. E. Grant, Mr. James Love, Mr. George Luffkin, and other gentlemen took part; and Mr. Street replied to some important questions regarding the employment of concrete, the construction of the pier, and the mode in which the difficulties encountered in the work were overcome. A vote of thanks was accorded to Mr. Street for his paper.

English Coal Mining.—A recently published Blue Book contains the reports made to the Home Office by Her Majesty's Inspectors of Mines, in pursuance of the Coal Mines Regulation Act. Accompanying these reports are summaries of the statistics for the twelve districts inspected, showing the aggregate number of persons employed, during the year, above and below ground in the coal, fire-clay, ironstone, and shale mines of Great Britain and Ireland. The first summary shows the number and ages of the male persons employed both above and below ground, and also the number and ages of the females employed above ground, together with the quantity of mineral raised in each of the twelve inspection districts. It appears that in the aggregate 494,391 persons were employed in and about the mines already mentioned. Of this number 395,025 were employed underground, and 99,366 (of whom 5378 were females) employed above ground; thus showing, as compared with the respective numbers employed during the year 1876, a decrease of 20,141—namely, 19,464 males and 677 females. The second summary gives the mining produce either in districts or counties, by which it appears that 134,179,968 tons of coal, 1,813,541 tons of fire-clay, 12,014,356 tons of ironstone, and 838,395 tons of shale, &c., were produced in the mines classed under the Coal Mines Regulation Act, including the quantity of iron pyrites, &c., found in working these mines, which is separately given in the respective districts to which the latter remarks apply. Comparing the above quantities with the output of 1876, an increase is shown in coal of 54,802 tons; fire-clay, a decrease of 258,412 tons; ironstone a decrease of 145,224 tons; and an increase of 205,730 tons in the quantity of shale, &c. Summary No. 3 contains an account of fatal accidents and lives lost during the year 1877 in and about all the mines coming within the scope of the Coal Mines Regulation Act. The fatal accidents amounted to 864, and the deaths occasioned thereby reached 1208, showing an increase, when compared with the summary of 1876, of 25 in the number of fatal accidents, and 275 in the number of lives lost. No. 4, the last of the summaries classed under this Act, shows the proportion which the accidents and deaths bear to the number of persons employed and the quantity of mineral raised. It appears that, on the average during the year under review, there was one fatal accident among every 572 persons employed in and about the mines, and one death by accident among every 409 persons employed; and that for each fatal accident 172,276 tons of mineral were got, and 123,217 tons for each death by accident. During the year 1876, of every 613 persons employed there was one fatal accident, and for every death by accident 551 persons were employed. For the year 1877, one accident has to be recorded for every 572 persons employed, and one death for every 409 persons employed. In 1876 the larger quantity of 177,580 tons of mineral were wrought per accident, and the larger quantity of 159,688 tons per death. In giving a synopsis of the summaries, and, after making comparison with those of the preceding year, it should be stated that, while the returns show a diminution in the number of persons employed, there was also a decrease of 154 mines at work, and that the quantity of mineral raised is smaller than that of 1876 by 143,125 tons.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

2028.—Bennett, P. D., Birmingham, "Improvements in apparatus employed in the purification of coal gas." May 21, 1878.

2037.—Clayton, S., Bradford, "Improvements in gas motor-engines, and in apparatus connected therewith." May 22, 1878.

2069.—Ripley, R. S., Strand, "Improvements in the process and apparatus for the manufacture of gas for heating and other purposes." A communication. (Complete specification.) May 23, 1878.

2070.—Lake, W. R., Southampton Buildings, London, "Improvements in water-meters." A communication. May 23, 1878.

2090.—Lake, W. R., Southampton Buildings, London, "An improved gas and water meter." A communication. May 24, 1878.

2095.—Clark, A. M., Chancery Lane, London, "An improved apparatus and process for manufacturing illuminating gas." A communication. May 24, 1878.

2103.—Gent, J. S., Manchester, "Improvements in gas-burners." May 25, 1878.

2106.—Martin, R., Howham, Sussex, "Improvements in the manufacture of gas, and apparatus suitable thereto." May 27, 1878.

2168.—Goodall, F., jun., Marsden, Yorks, "A new or improved union or joint for pipes, and in washers for the same." May 30, 1878.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

4454.—Justice, P. S., Southampton Buildings, London, "A new combined tap and faucet." A communication. Nov. 27, 1877.

4576.—Hilton, M., Prestwich, Lancs, "Improvements in the manufacture of gas." Dec. 3, 1877.

314.—Wilson, W. V., Mile End, London, "Improvements in the manufacture of cyanogen products from gas residues." Jan. 24, 1878.

1299.—Clark, A. M., Chancery Lane, London, "An improved gas lighter." A communication. April 2, 1878.

NOTICE OF APPLICATION FOR LEAVE TO FILE A DISCLAIMER AND MEMORANDUM OF ALTERATION.

3101.—Mewburn, J. C., Fleet Street, London, "Improvements in lighting railway carriages with gas, and in the apparatus employed therein." A communication. Sept. 22, 1873.

PATENTS WHICH HAVE BECOME VOID.

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1790.—Jameson, J., and Schaeffer, A. G., "Improvements in centrifugal pumps." May 13, 1875.

1816.—Wallace, J., "A new and improved pump for pumping water, air, or gases." May 15, 1875.

TO GAS ENGINEERS.

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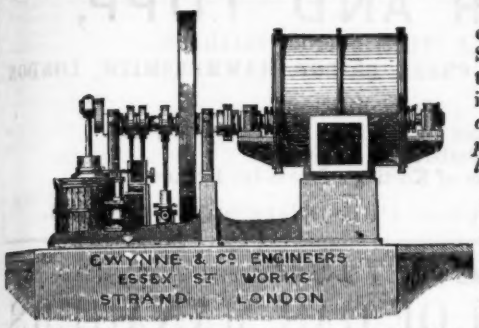

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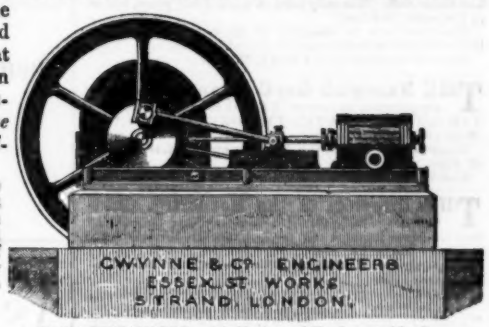

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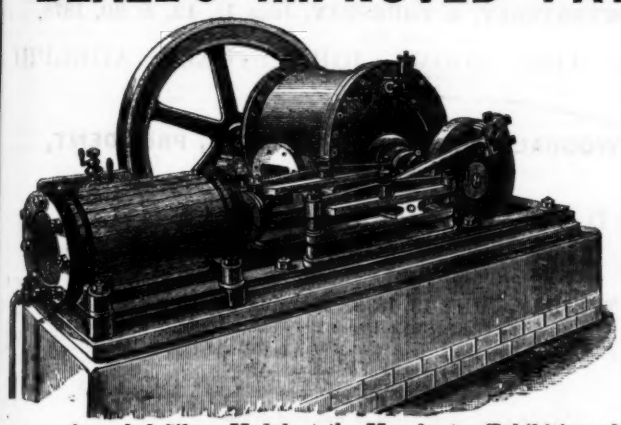

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N.B.—Prices on personal application, or by post or telegram, on shortest notice, and prompt delivery.

WANTED, Readers of the Pamphlet, "Cooking and Heating by Gas; on Burners," &c.
Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Gas-Works, SYDENHAM, S.E.

SPENT OXIDE OF IRON.

WE are open to Buy this in any quantity.
Address, with price, to NICHOLSON AND SONS, Chemical Works, Hunslet, near LEEDS.

ON SALE—A Station-Meter (with new Drum), capable of passing 10,000 cubic feet per hour, with Hydraulic Valves, Bye-Pass, &c.; 10-in. Connections. Has been removed to make room for one of larger capacity.
For particulars and price, apply to GEORGE NEWTON, Gas-Meter Manufacturer, Union Street West, OLDHAM.

ON SALE—One Station-Meter, to pass 1000 cubic feet per hour. Almost new. Will be sold cheap.
Apply to J. HALL, Gas-Works, St. Helen's, LANCS.

RIPON CORPORATION GAS-WORKS.

EXHAUSTER for Sale (by Dempster), with Engine, Bye-pass Valve, and Governor complete, capable of passing 3000 cubic feet per hour. Has been five years at work, and is in good repair, being sold to make room for a larger one.
Apply to GEO. IRVINE, Gas-Works, RIPON.

THORNE GAS COMPANY, NEAR DONCASTER.

TO BE SOLD—Two Purifiers, 6 ft. by 3 ft. 6 in., with Covers and Wrought-Iron Grids complete. Also a 6-way Hydraulic Centre-Valve, with 6-in. Inlet and Outlet complete.
The whole in good condition, and for sale in consequence of larger ones being put down.
Apply to JOHN ACASTER, Secretary.

SPENT OXIDE OF IRON.

TO BE SOLD—About 40 or 50 Tons.
Samples and particulars may be obtained on application to W. UPTON TINNEY, Manager, Gas-Works, WINCHESTER.

GODALMING GAS-WORKS.

A Set of Three 6-feet Square Purifiers, Sieves, Lifting-Gear, and Centre-Valves, all complete, in good condition, and have been in constant work up to the 15th inst. (made by Cockey and Son, Engineers, Frome), are now for sale, larger ones having been erected.
To be taken down and removed at the purchaser's expense.
For further particulars, apply to Mr. A. COLPUS, Secretary.

TO GAS COMPANIES AND OTHERS.

THE East Retford Gas Company, Limited, have on SALE the following:—

One 4-Horse Vertical Steam-Engine, high pressure, 6-in. Cylinder, 12-in. Stroke, 4-ft. Fly-Wheel, Pump, Governors, and Stone Bed.

One 6-Horse Vertical Steam-Engine, high pressure, 8-in. Cylinder, 16-in. Stroke, 6-ft. Fly-Wheel, Pump, Governors, and Stone Bed. Has only been in work Four years, and is in first-rate condition.

The above can be inspected at the Gas-Works. Have been removed to make room for one of larger size.

Offers to be made to F. BAILEY, Manager.

THE Nantwich Gas Company, Limited, are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their Works from the 1st of July.

Tenders to be sent to the Manager on or before the 15th of June.

Gas-Works, Nantwich, Cheshire, May 25, 1878.

THE Directors of the Rochester, Chatham, and Strood Gaslight Company have for disposal two six-horse Engines and Boilers, recently thrown out of use, and about 150 Retort Mouthpieces, Ovals, 21 in. by 15 in.; and Rounds, 15 in. by 15 in.; with Outlets for 6-in. Ascension Pipes.

The articles may be seen on application at the Office.

Tenders for the whole or any part of the above, marked "Tender for Materials," may be sent not later than Wednesday, June 12, addressed to the Secretary, at the Office, 56, High Street, Rochester.

The Directors do not bind themselves to accept the highest or any tender.

WILLIAM SYMS, Secretary.

May 17, 1878.

TAR AND AMMONIA WATER.

TO BE DISPOSED OF, the Tar and AMMONIA WATER produced at the Merthyr Tydfil Gas-Works.

The Directors of the Company will be glad to receive offers to purchase the same for a period of Three or Five years.

Particulars as to quantity, &c., may be obtained of the undersigned.

The right to accept or refuse the highest or any offer is reserved.

By order,
J. L. COCKER, Secretary and Manager.
Gas Office, Merthyr Tydfil, Glamorganshire,
May 20, 1878.

TO BUILDERS AND GASHOLDER MAKERS.

THE Briton Ferry Local Board invite TENDERS, with drawings and specifications, for the following Contracts:—

Contract No. 1.—To Supply and Erect a Gasholder, 55 ft. diameter and 16 ft. deep, with 8-in. Inlet and Outlet Pipes complete; and for Supplying Annular Condensers, two 8 ft. square Purifiers, Hydraulic Main, &c.

Contract No. 2.—Comprises Brick Tank for Gasholder, addition to Retort-House, Purifiers Shed, Coal Shed, &c.

Printed particulars and forms of tenders may be obtained on application to Mr. William Chayne, Engineer, Gas-Works, Briton Ferry.

Tenders, properly endorsed, must be sent in to me on or before Tuesday, the 11th day of June next.

The lowest or any tender not necessarily accepted.

JAMES KEMPTHORNE, Clerk.

Duffryn Chambers, Neath.

TO ENGINEERS, IRONFOUNDERS, AND OTHERS

THE Atherton Local Board invite TENDERS for the Manufacture and Erection of a Wrought-Iron ROOF of a Retort-House, and the IRON-WORK of a Retort-Bench, &c., at their Gas-Works, Atherton.

Drawings and specifications may be seen, and quantities had, at the Gas-Works, Atherton, or at the Office of the Engineer, Mr. Thomas Newbigging, 5, Norfolk Street, Manchester, on payment of one guinea (to be returned on receipt of a *bonâ fide* tender), on and after Monday, the 27th inst.

Tenders, endorsed "Retort-House Roof," &c., to be sent to the undersigned, on or before Monday, the 10th of June.

The Board do not pledge themselves to accept the lowest or any tender.

DANIEL SCHOFIELD, Clerk.

Local Board Office, Atherton, May 23, 1878.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Accrington Gas and Water Works Company invite TENDERS for the TAR and AMMONIACAL LIQUOR produced at their Accrington Works for One, Two, or Three years, from July 1 next. Quantity of coals carbonized about 8500 Tons.

Any further information can be had on application to the undersigned.

Tenders, endorsed "Tender for Tar and Liquor," to be sent in not later than Thursday, the 13th inst., addressed to the Chairman, Gas and Water Works Company, Accrington.

CHARLES HARRISON, Secretary.

Offices of the Company, Accrington, June 1, 1878

BURTON-ON-TRENT GAS-WORKS.

CONTRACTS FOR IRON ROOFING, RETORT FITTINGS, PURIFIERS, AND OTHER APPARATUS.

THE Commissioners for Executing the Town of Burton-upon-Trent Act, 1853, are prepared to receive TENDERS for the Construction and Erection of certain Wrought-Iron ROOFING, required for the Extension of their Gas-Works at Burton-on-Trent, comprising Roofs of 52, 35, and 30 ft. spans or thereabouts; also for the Gas-Making and Purifying Apparatus, comprising 56 Retort Mouthpieces, and the Furnace Fittings and Ascension-Pipes connected therewith; two Hydraulic Mains; and other materials and apparatus.

Drawings may be seen, and specification and form of tender may be had, on application at the Office of Mr. Mudie, the Manager of the Commissioners Gas-Works, Burton-on-Trent, on and after Wednesday, the 29th day of May inst., and at the Office of Messrs. Thomas and Charles Hawksley, Civil Engineers, 30, Great George Street, Westminster, S.W., and tenders must be delivered to me at the Offices of the Commissioners, on or before 10 o'clock a.m. of Wednesday, the 12th day of June next.

The Commissioners do not pledge themselves to accept the lowest or any other tender.

By order,
T. N. WHITEHEAD, Clerk to the Commissioners.
Burton-on-Trent, May 18, 1878.

BIRMINGHAM GAS APPARATUS EXHIBITION,
FLOOR CORRIDOR WEST,
1-Horse Power Gas-Heated Boiler and Engine, in motion.

MILLER AND TUPP,

ENGINEERS & STEAM-LAUNCH BUILDERS,
ANCHOR ENGINE WORKS, CREEK BRIDGE, HAMMERSMITH, LONDON.

Spécialités:
Steam-Launches, from 20 feet long, fitted complete, £80.
Gas-Heated Steam-Boilers and Engines.
Supply and Erection of Körting's Steam-Jet Exhausters.

Illustrated Descriptive Price Lists on application.

BRITISH
ASSOCIATION OF GAS MANAGERS.

ANNUAL MEETING OF MEMBERS.

PROGRAMME OF ARRANGEMENTS.

THE

FIFTEENTH ANNUAL GENERAL MEETING

OF THE MEMBERS OF THIS ASSOCIATION WILL BE HELD ON

TUESDAY, WEDNESDAY, & THURSDAY, June 18, 19, & 20, 1878,

AT THE

SOCIETY OF ARTS ROOMS, JOHN STREET, ADELPHI,

LONDON.

CORBET WOODALL, ESQ., MEMB. INST. C.E., PRESIDENT,
Will occupy the Chair.

ORDER OF PROCEEDINGS.

TUESDAY, JUNE 11, a *pro formâ* Meeting only will be held at the Offices of the Association, at Eleven o'clock a.m.

TUESDAY, JUNE 18, 1878.—Morning Meeting.

The Chair to be taken at Ten o'clock.

Inaugural Address by the President. | Admission of New Members.
Reading of Papers and Communications.

Evening Meeting.

The Chair to be taken at Half-past Seven.

A Lecture will be delivered by THOMAS WILLS, Esq., F.C.S., on "The Products of Combustion."

WEDNESDAY, JUNE 19, 1878.

The Chair to be taken at Ten o'clock.

Reading of Papers and Communications, and the Transaction of other Business.
Election of Officers for the ensuing Year, &c.

At Six p.m. the Members and Friends will dine together at the City Terminus Hotel, Cannon Street.

Tickets for the Dinner, 7s. 6d. each, may be had from the Secretary, if taken on or before the 18th of June. After that date 10s. will be charged.

THURSDAY, JUNE 20, 1878.

The Members are invited to meet at the Phœnix Gas Company's Station, Kennington Lane, where the largest Gasholder at present in existence is in the course of construction. They will then be conducted to the Vauxhall Railway Station, and conveyed to Hampton. Here an inspection of the Works of the Grand Junction Water Company, and those of the Southwark and Vauxhall Water Company, will take place. They will then proceed to Bushey, where lunch will be provided. The Great Hall, Picture Galleries, and Grounds of Hampton Court Palace may then be viewed, after which the party will return to London by train from Hampton Court.

LIST OF PAPERS AND COMMUNICATIONS

TO BE SUBMITTED TO THE MEETING.

Report of the Committee and Proposed Alteration of Rules.

The Order in which the Papers are to be Read will be determined by the Committee prior to the Meeting, so as to suit the general convenience.

1. "Brick, Concrete, and Composite Tanks." By W. RICHARDS, of London.
2. "Transfer of Gas-Works." By A. PENNY, of London.
3. "Capital and Revenue." By G. LIVESEY, of London.
4. "Preventible Waste." By C. HUNT, of Birmingham.
5. "A New Standard for Determining the Illuminating Power of Gas." By J. METHVEN, of London.
6. "Some of the Causes tending to Retard the Application of Gas for Heating Purposes." By T. TRAVERS, of Cork.
7. "Some Experiments with Ammoniacal Liquor as a Purifying Agent." By F. LIVESEY, of London.
8. "The Correct Method of Analysis, and the Correct Valuation of Residual Gas Products." By G. E. DAVIS, of Manchester.
9. "Some Notes on the Construction of Retort-Settings." By G. E. STEVENSON, of Peterborough.
10. "The Purification of Coal Gas with Anhydrous Peroxide of Iron." By G. E. DAVIS, of Manchester.
11. "The Northern Coal Field, with especial reference to the Gas Coal District of Durham." By G. A. LEBOUR, of Newcastle.
12. "The Purification of Gas by Liquids." By F. D. MARSHALL, of Brentford.
13. "Cooking by Gas." By S. LEONI, of London.
14. "Improvements in Carbonizing Apparatus." By W. T. CARPENTER, of Sheerness.

June 4, 1878. WILLIAM H. BENNETT, *Secretary.*

MACCLESFIELD CORPORATION GAS-WORKS.

CANNEL AND COAL CONTRACTS.

THE Gas Committee are prepared to receive TENDERS for the Supply of the whole, or part of, 4000 Tons of CANNEL, and 6000 Tons of GAS COAL; the deliveries to extend to Two years, from the 1st of August ensuing, free at Macclesfield, and in such quantities as may be ordered by the Manager.

Tenders, specifying the description of Cannel or Coal, the pits at which they are to be raised, and the terms for net monthly payments, to be sent in not later than June 22, addressed to the Chairman, Gas Committee, Town Hall, Macclesfield.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS MOORE, Manager.

May 27, 1878.

BOROUGH OF BIRKENHEAD.

TO IRONFOUNDERS.

THE Gas and Water Committee invite TENDERS for the Supply of Cast-Iron PIPES of different sizes, from 2 in. to 24 in. internal diameter, to meet their requirements during the twelve months ending June 30, 1879.

Form of tender and copy of specification may be obtained upon application.

Tenders, endorsed "Tender for Pipes," and addressed to the Chairman of the Gas and Water Committee, 50, Hamilton Square, Birkenhead, to be sent in not later than Friday, the 21st inst.

The Committee do not bind themselves to accept the lowest or any tender.

AMBROSE WALN, Town Clerk.

June 1, 1878.

TO COLLIERY PROPRIETORS, COAL MERCHANTS, AND OTHERS.

THE Directors of the Alton Gas and Coke Company invite TENDERS for the Supply of 750 Tons of good Screened GAS COAL, to be delivered free on rail at Alton Station (L. & S. W. R.), in the following quantities:—

200 Tons during Sept., 1878.
200 ,, ,, Dec., 1878.
200 ,, ,, Feb., 1879.
150 ,, ,, Mar., 1879.

The Coal to be of good quality, and free from refuse; and parties tendering are requested to state from what district and pits it is obtained.

Terms of payment, cash.

Tenders to be sent in not later than Monday, July 1, 1878.

The Directors do not bind themselves to accept the lowest or any tender.

H. W. ELLIOTT, Secretary.

Alton, Hants, May 30, 1878.

GUILDFORD GASLIGHT AND COKE COMPANY.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the above Company are prepared to receive TENDERS for the TAR and AMMONIACAL LIQUOR produced at their Works for the year ending June 30, 1879.

Tenders, properly endorsed, to be delivered on or before June 14 next, to Mr. Longworth, Gas Offices, Guildford, from whom any further required information may be obtained.

Guildford, May 30, 1878.

BOROUGH OF BIRKENHEAD.

THE Gas and Water Committee invite TENDERS for the Supply of Best Screened GAS COAL and Screened CANNEL, at the rate of 8000 Tons Coal and 14,000 Tons Cannel per annum, for One, Two, or Three years, from July 31 next, to be delivered at the Gas-Works, Thomas Street, Birkenhead, in weekly quantities to be agreed upon; also TENDERS for the Supply of STEAM COAL delivered at their Water-Works, Spring Hill, Balls Road, and Flaybrick Hill, Upton Road, in quantities as may be ordered by their Engineer, during One, Two, or Three years, from July 31 next.

Tenders, specifying the description of Cannel or Coal, and endorsed "Tender for Coal," &c., addressed to the Chairman of the Gas and Water Committee, 50, Hamilton Square, Birkenhead, to be sent in not later than Friday, the 21st proximo.

The Committee do not bind themselves to accept the lowest or any tender, and they are to be at liberty to accept any less quantity at the rate quoted.

AMBROSE WALN, Town Clerk.

May 27, 1878.

RADCLIFFE AND PILKINGTON GAS COMPANY.

TAR AND AMMONIACAL LIQUOR CONTRACT.

THE Directors of the above Company are prepared to receive TENDERS for the Purchase of the TAR and AMMONIACAL LIQUOR made at their Works, Egerton Street, Sion Street, Radcliffe, for a period of One or Two years, commencing from the 1st day of August next.

Tenders must state the price which will be given per Ton for Tar or Ammoniacal Liquor, separately or together; the purchaser to provide barrels and cartage from the Works, and the Company to fill them on the Works.

The purchase to be paid for monthly.

Tenders to be sent to the Manager and Secretary not later than Thursday, July 4, 1878.

By order,

JOHN BRANDWOOD, Manager and Secretary.

Sion Street, Radcliffe, May 24, 1878.

MANCHESTER CORPORATION GAS-WORKS.

AMMONIACAL LIQUOR.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Purchase of the AMMONIACAL LIQUOR to be produced at their Gaythorn and Rochdale Road Works during a period of One or more years, commencing from the 1st day of January, 1880.

In addition to tenders for the purchase of the Liquor in its crude state, the Committee will also be prepared to consider TENDERS for its DISPOSAL, either by manufacture into Sulphate of Ammonia at the above-mentioned Works on their behalf, or in any other manner.

The Committee reserve to themselves the option of accepting the offer, the terms of which they may deem most advantageous.

They do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, Town Hall, and endorsed "Tender for Ammoniacal Liquor," must be delivered at these Offices, on or before Thursday, the 1st day of August next.

Forms of tender and further particulars can be obtained on application to Mr. George B. Jackson, at the Gas Offices. By order of the Gas Committee,

JOSEPH HERON, Town Clerk.

Town Hall, Manchester, May 31, 1878.

BOROUGH OF BARROW-IN-FURNESS.

TO COLLIERY PROPRIETORS.

THE Gas and Water Committee invite TENDERS for the Supply of GAS COAL and CANNEL for a term of One, Two, or Three years, from the 30th day of June next.

Quantity required per annum, about 7000 Tons of Coal, and 2500 Tons of Cannel.

Further particulars may be obtained on application to Mr. A. C. Fraser, Manager, Gas and Water Works, Barrow-in-Furness.

Tenders, properly endorsed, must be sent to these Offices, addressed to "The Chairman of the Gas and Water Committee," on or before Tuesday, the 11th of June next.

By order,

C. F. PRESTON, Town-Clerk.

Municipal Offices, Barrow-in-Furness.

TO GAS-METER MANUFACTURERS.

G. A. BAILEY AND CO.,

MANUFACTURERS OF EVERY DESCRIPTION OF

Station, Hourly Rate, Experimental, and other Indexes, Wheel and Worm Cutters,

86, CRAMPTON STREET, NEWINGTON BUTTS, LONDON, S.E.

N.B.—Materials found or otherwise.

Now Ready, price 28s., handsomely bound in Morocco, cloth sides, gilt edged and lettered,

THE FIRST VOLUME

OF

KING'S TREATISE

ON THE

SCIENCE AND PRACTICE OF THE MANUFACTURE & DISTRIBUTION

OF

COAL GAS.

EDITED BY THOS. NEWBIGGING, C.E., M.INST.C.E., AND W. T. FEWTRELL, F.C.S.

This Volume contains 460 pages of Letterpress, and is illustrated by 521 Woodcuts and 36 page and double-page Engravings, printed on Plate paper, and a full-page

COLOURED ENGRAVING OF THE BECKTON GAS-WORKS,

Forming a Frontispiece to the Volume.

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GAS ENGINEERS, FROME SELWOOD,

MANUFACTURERS OF ALL DESCRIPTIONS OF

APPARATUS CONNECTED WITH GAS-WORKS.

THE ORIGINAL PATENTEES AND MANUFACTURERS OF THE

DRY-FACED VALVES

FOR PURIFIERS, GASHOLDERS, BYE-PASS, AND OTHER ARRANGEMENTS REQUIRING VALVES IN GAS-WORKS.

The Faced Valves, as made by the Patentees, continue to give great satisfaction, and they are being used extensively by many of the best gas engineers of the day.

They are more easily repaired than any other kind of Valve in use, and can be re-ground in a few hours without removal, and made perfectly gas-tight.

References can be given to many Engineers of high standing, who will testify as to the favour in which they are held.

MANUFACTURERS ALSO OF SUPERIOR WOOD GRIDS FOR PURIFIERS, SCRUBBERS, &c.

NOTICE TO MANAGERS OF GAS COMPANIES.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to

FRANK M'GEDY, Secretary.

126, Chancery Lane, London.

A PAMPHLET ON DIP-PIPES, &c., post free 6½d., on application to W. WHITE, Gas-Works, Abersychan, Mon. See Reviews in the *Gas Trade Circular and Review*, March 29, 1878, and *Design and Work*, March 30, 1878.

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FERGUSON, Builder and Contractor. Kite method of Repairing Church Spires and High Chimneys. Chimneys straightened, pointed, and hooped. Old Chimneys pulled down by a process requiring no scaffolding or stoppage of work, by competent workmen under personal supervision. For Lightning Conductors—cheapness and method of fixing—apply to C. R. FERGUSON, 12, Canal Road, MILE END.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analyzed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67 *candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·88.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON.

THE BROUGHTON COAL COMPANY,

COLLIERIES, NEAR WREXHAM,

Are prepared to Supply their excellent GAS COAL on very favourable terms.

This Coal yields more than 10,000 cubic feet per Ton of gas of good quality, *in practical working on the large scale.*

A large purchaser reports the coke to be clear, of a quality rarely equalled in the retort-furnace, and much liked by the stokers.

YEO'S PATENT ENGINE PACKING,

Price 1s. 8d. per lb., any size.

Tarred & White Spun Yarn for Pipe Joints, at various prices.

Samples and testimonials free per post.

E. YEO, NEWTON ABBOT.

JOHN SPENCER,

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TUBES & FITTINGS,

Plant, Tools, Stores, and all requisites for Gas and Water Works: Gasholders, Purifiers, Scrubbers, Roofing, Sashes, Retort Fittings, Grids, Socket-Pipes, Lamp-Posts, Wheelbarrows; Brasswork, Chandeliers, and Gas-Fitters Tools; Liquor-Pumps, Valves; Clay Retorts and Fire Goods, &c.

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Public Accountant,

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OLD BROAD STREET, E.C.

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A great improvement on the old-fashioned 14-in. Lamps.

They have been sold to various Gas-Works throughout the country and abroad, and the highest satisfactory testimonials are given as to their superiority.

For particulars of price, &c., apply to

WILLIAM KEEN, Sole Proprietor and Manufacturer, Robertson Street, HASTINGS.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

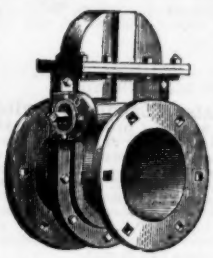
Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

B. DONKIN & CO.'S

IMPROVED GAS-VALVES

WITH WROUGHT-IRON PINIONS.



List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are proved on both sides to 30 lbs. on the square inch before leaving th works, and are kept in stock.

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J. BEALE'S NEW PATENT GAS EXHAUSTERS,

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STEAM ENGINES FOR DRIVING GAS EXHAUSTERS, VALVES FOR AMMONIACAL LIQUOR, IMPROVED BRIDGE VALVES FOR REGULATING THE SEAL IN HYDRAULIC MAINS, BYE-PASS VALVES, SCREW WATER-VALVES.

B. DONKIN & CO, 55a, BLUE ANCHOR ROAD, BERMONDSEY, LONDON, S.E.

TO GAS COMPANIES AND THE TRADE.

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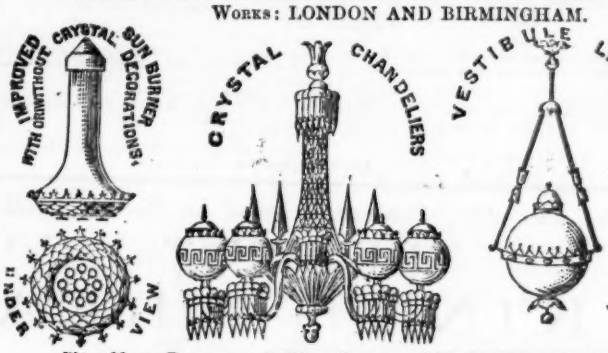

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CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.

All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.

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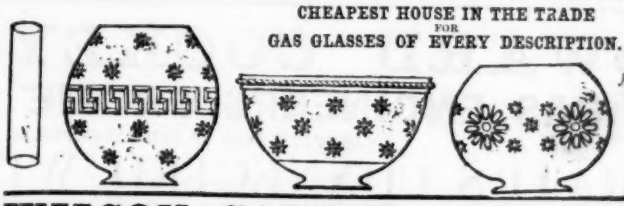
OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.

COMMERCIAL GLASS WORKS, 27, WELLCLOSE SQUARE, LONDON, E.

CHEAPEST HOUSE IN THE TRADE FOR GAS GLASSES OF EVERY DESCRIPTION.



Write for Lists, free on application to any part of the World.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

ECONOMY IN THE PRODUCTION OF GAS.

PLUTONIC CEMENT,

For Jointing and Repairing Retorts and Ovens *in* action and *out* of action.

A Pamphlet on the advantages of the above, with modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,

WILLIAM RICHARDSON, GAS AND HYDRAULIC ENGINEER,

CHARLES HENRY STREET AND BISSELL STREET, BIRMINGHAM.

GREAT SAVING OF LABOUR.

ENOCH'S PATENT

PORTABLE DRILLING-MACHINE,

Now in use by all the Principal Gas and Water Companies in the United Kingdom.

E Size, for Services in Pipes, 2 to 3 in. bore	£3 10 0
F Size, for Services in Pipes, 2 to 4 in. bore	4 0 0
G Size, for Services in Pipes, 2 to 6 in. bore, with Telescope Cramp.	4 10 0

Drills, 1s. 6d. each.

Machines sent on approval, if desired.

Prices for other Sizes and Modifications, with full Particulars and Testimonials, on application to

ALEXANDER ANDERSON,

Office: 9, London Street, E.C. Warehouse: Vine Street, Minories, London, E.

GAS PURIFICATION.

BAILES & HALLSWORTH,

CONTRACTORS FOR THE

PURIFICATION OF COAL GAS

BY THEIR

PATENT HYDRATED PEROXIDE OF IRON MATERIAL.

The Material is adapted specially for taking up sulphuretted hydrogen, and will simultaneously absorb any ammonia that may pass the scrubbers.

The spent oxide resulting from our Material is more valuable than that from natural oxide of iron, and manufacturing chemists buy it in preference.

The Material has now been in use during the past three years in most of the principal Gas-Works in Yorkshire and elsewhere.

It contains considerably less moisture than natural oxide of iron, and is much cheaper and more efficient as a purifying agent.

B. & H. are purchasers of Spent Oxide, or will take Spent in exchange for New Material.

FOR SAMPLES AND TERMS, ADDRESS—

BAILES & HALLSWORTH, COPPERAS WORKS, ARMLEY. LEEDS.

J. & J. BRADDOCK,

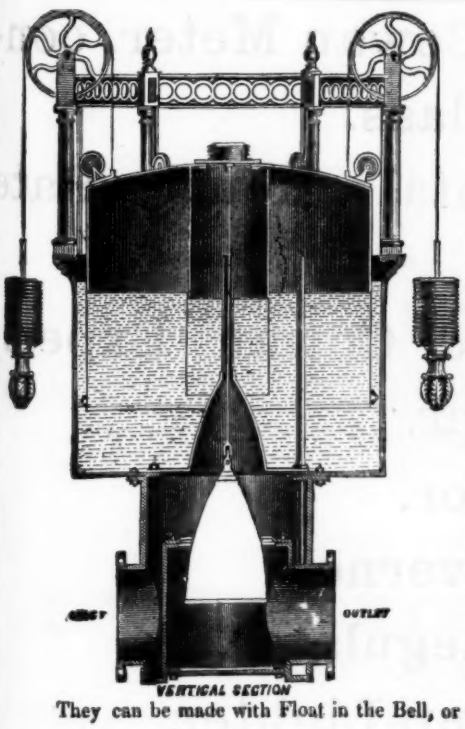
GLOBE METER-WORKS,

OLDHAM,

Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Improved Retort-Settings. Guaranteed to heat and wear well, with great economy of Fuel.

Coloured lithograph copies of Working Drawings of Beds of One to Seven Retorts (so clearly arranged and fully shown as to be easily understood by any retort setter or bricklayer) having been made of these valuable settings, they can now be supplied with detailed Specification immediately on receipt of orders.

Apply to Mr. THOS. NEWBIGGING, Consulting Gas Engineer, 5, Norfolk Street, MANCHESTER.

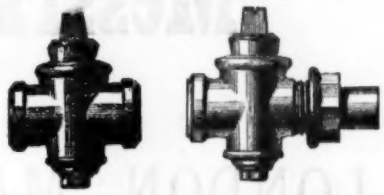
LAMBERT'S

CAST-IRON GAS-MAIN COCKS,

WITH PATENT WHITE METAL PLUGS.

TRADE (L) MARK.

No. 758. No. 759.



The bodies of these Taps are made of iron, black or galvanised, and the plugs of patent metal. They are warranted not to set fast or corrode, as do Iron or Brass Cocks; will always work easily; are strong, well made, durable; of little or no intrinsic value, and therefore not likely to be stolen; and the prices as stated below are (especially upon the larger sizes) fully 50 per cent. less than Brass Cocks.

	½	¾	1	1¼	1½	2-inch.
No. 758, with inside screws for iron pipe, black	2/0	3/0	4/4	6/6	7/8	12/0 each.
No. 759, with union on one end screwed inside for iron pipe, black	2/9	3/10	5/4	8/0	9/0	15/6 each.
Nos. 758 and 759, galvanised	0/3	0/4	0/6	0/8	0/10	1/4 extra.

MANUFACTORY:

SHORT STREET, LAMBETH, LONDON.

MANN & OWENS

PATENT SCREW & CAM GAS-VALVES.

SIZES from 2 In. to 48 In.

As supplied to THE GASLIGHT & COKE CO., LONDON: The CORPORATIONS of MANCHESTER, BIRMINGHAM, CARLISLE, OLDHAM, STOCKTON, HALIFAX, &c. And to the following Companies—viz.: PHŒNIX, SOUTH METROPOLITAN, BRENTFORD, WINDSOR ROYAL, IPSWICH, WEST HAM, BILSTON, ARUNDEL, DUDLEY, ST. HELEN'S, MORECOMBE, THRAPSTONE, &c., And to the various WORKS of the BRITISH GASLIGHT COMPY.

Every Valve warranted perfectly Gas-tight.

SOLE MAKERS, S. OWENS & CO., ENGINEERS, WHITEFRIARS STREET, LONDON.

PRICES ON APPLICATION.

GRIRDROD'S PATENT

PORTABLE PIPE SCREWING MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers, ALBION WORKS, SALFORD, LANCASHIRE.

BIRMINGHAM GAS APPARATUS EXHIBITION,

TOWN HALL, BIRMINGHAM,

JUNE 5 *to* 11, 1878.

Messrs. W. & B. COWAN,

OF

LONDON, MANCHESTER, & EDINBURGH,

Are Exhibitors of the following Apparatus in action, and respectfully invite examination of same by Engineers, Managers of Gas-Works, &c.:—

A 3-Light Warner and Cowan Meter, constructed mostly of glass.

A 3-Light Experimental Hourly-Rate Meter.

A 5-Light Warner and Cowan Experimental Testing-Meter.

A 2-inch Foulis Governor.

A 1½-inch Foulis Dry Governor.

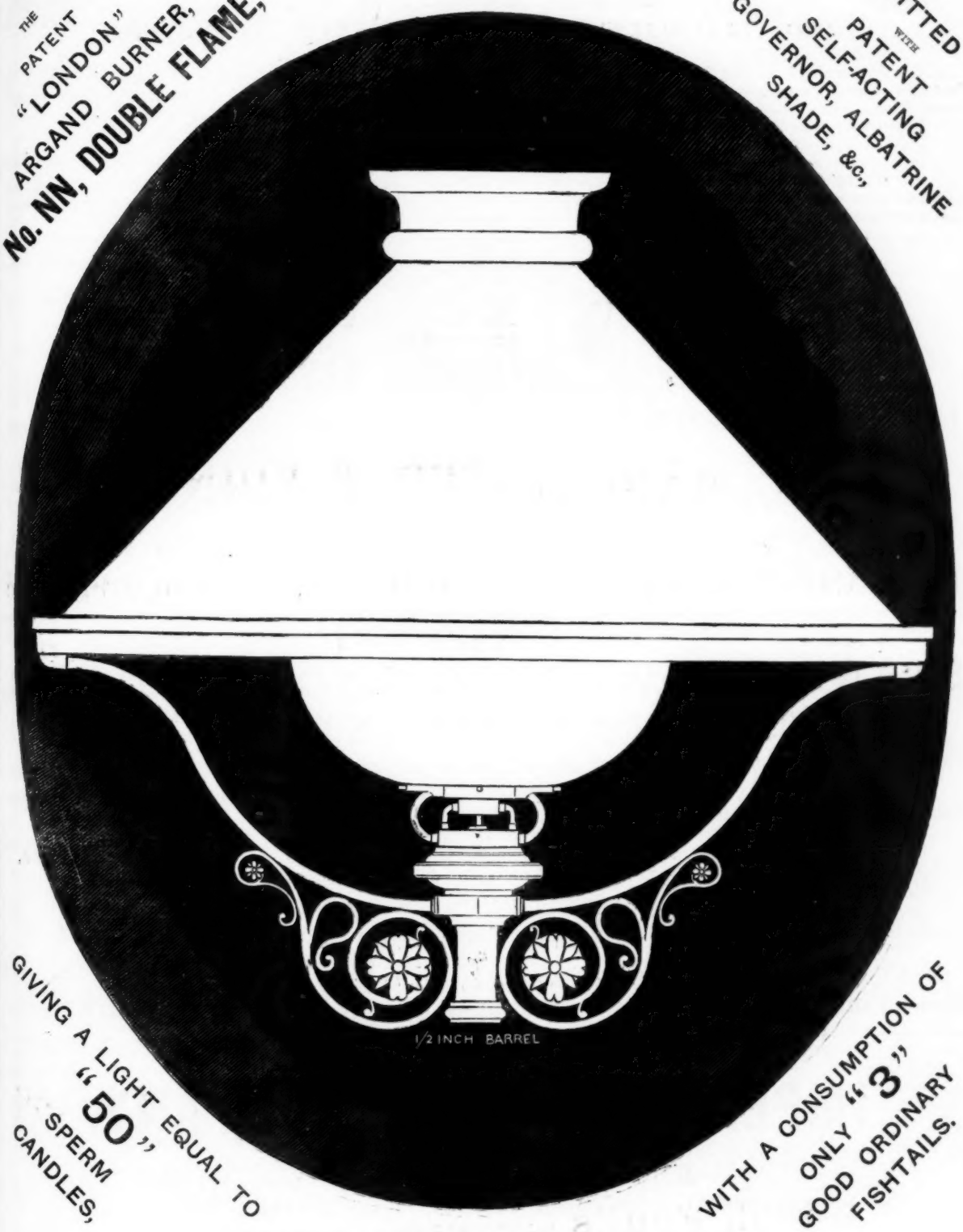
A Foulis Street-Lamp Regulator.

A Foulis Automatic Lamp-Lighter.

POWERFUL LIGHT CENTRE.

THE PATENT "LONDON" ARGAND BURNER, No. NN, DOUBLE FLAME,

FITTED WITH PATENT SELF-ACTING GOVERNOR, ALBATRINE SHADE, &c.,



GIVING A LIGHT EQUAL TO "50" SPERM CANDLES,

WITH A CONSUMPTION OF ONLY "3" GOOD ORDINARY FISHTAILS.

NEAREST APPROACH TO DAYLIGHT.

WILLIAM SUGG,

GAS ENGINEER,

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HALLETT'S
PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

This Paint having been in general use over sixteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known. Its advantages are that—

It does not require DRIERS like other Paints.

It does not poison the painter like white lead. No colic by its use.

It has greater durability in colour, as sulphurous gases do not blacken it as they do white lead.

It is of a light stone colour, and has a body equal to white lead, and as its specific gravity is so much less, it covers equally well one-third more surface, by which a great saving is effected; a similar economy arises from its use in steam and gas joints, for which purpose it is superior to white lead.

ALDER AND MACKAY,

GRANGE WORKS, EDINBURGH,

MANUFACTURERS OF

CONSUMERS IMPROVED GAS-METERS;

IMPROVED DRY GAS-METERS, in Cast-Iron and Tin Cases,

OF THE HIGHEST EXCELLENCE,

Warranted to measure correctly, and not to vary.

STATION METERS AND GOVERNORS,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c.

THE

STANDARD WASHER AND SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]

Some of the advantages claimed for this Apparatus are as follow:—

The Exposing of a large Amount of Effectually-wetted Surface (which is continually reproduced) to act upon the Gas.

Unerring Regularity in the Distribution of the Liquor.

Saving of Expense in Providing and Exchanging Scrubbing Material—none being required.

Economy of Space, thus enabling the Apparatus to be protected from the Weather.

Economy of First Cost and of Maintenance.

It works without Pressure.

It is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured.

Applications for Prices, &c., to be made to

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

THE

IMPERIAL METER COMPANY,

LIMITED.

KING'S ROAD, LONDON, N.W.,

OFFICE: 115, VICTORIA STREET, WESTMINSTER, S.W.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

NOTICE.

THE GAS & WATER COMPANIES DIRECTORY, 1878.

(WATER SECTION.)

The Editor will feel greatly obliged if Secretaries and Engineers would fill up, and return to him at once, the forms sent them, as the work is now going to press. If any have not received Forms, they will be forwarded immediately, on application to the Editor,

CHARLES W. HASTINGS,
8, BUCKINGHAM STREET, ADELPHI, LONDON, W.C.

JAMES MILNE & SON,

GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.
Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,
35A, GREAT GEORGE STREET,
WESTMINSTER, S.W.,
PATENTEE and MANUFACTURER of the following Invention
RETORT SETTINGS—giving great Economy of Fuel.
STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.
FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.
PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

CANNEL COAL.

ELLIS LEVER & CO., Central Coal Offices, 46, Cannon Street, London, E.C., and 6, Piccadilly, Manchester, are prepared to contract for the supply of THE BEST CLASSES of CANNEL and GAS COAL, for long or short periods. Analysis and prices on application.

ELLIS LEVER & CO.,

CANNEL AND GAS COAL CONTRACTORS,
Shippers of Steam and House Coal
AT ALL
ENGLISH, SCOTCH, AND WELSH PORTS.

46, CANNON STREET, LONDON,
AND
6, PICCADILLY, MANCHESTER.

ALFRED LASS,

SPECIAL ACCOUNTANT FOR GAS COMPANIES,
30, GRACECHURCH STREET, LONDON.

Accounts analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.
The Forms of Account, which have been specially designed by A. L. to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.
The above forms are registered.
Water Companies Accounts also prepared and adjusted.
CONSULTATIONS.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,
5, NORFOLK STREET, MANCHESTER.

MR. EDWARD SANDELL,

Associate of the Society of Accountants in England,
Publisher of the
"Gas Companies Expenditure Journal,"
Begs to announce his REMOVAL from Skinner's Place, Size Lane, to
No. 2, ST. GEORGE STREET, WESTMINSTER.

Mr. ROBERT DEMPSTER, Sen.,

CONSULTING GAS ENGINEER,
Of Messrs. Robert Dempster and Sons, Rose Mount Gas Engineering Works,
ELLAND, near HALIFAX,
May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Our R. D., Sen., having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations, is both extensive and reliable.

REMOVAL.

CHARLES HEISCH, F.C.S., Analytical

and Consulting Chemist, Superintending Gas Examiner to the Corporation of London, &c., &c., has REMOVED from 8, Savage Gardens, to 79, MARK LANE, where he may be consulted as usual.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER
AND
CANNEL COAL FACTOR,
30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.
GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTER-MIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

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MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,
SCOTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.
Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

BOUCK & CO., LIMITED,

TAR DISTILLERS & MANUFACTURING CHEMISTS,
MILES PLATTING, MANCHESTER.
BRANCH WORKS, BLACKBURN.

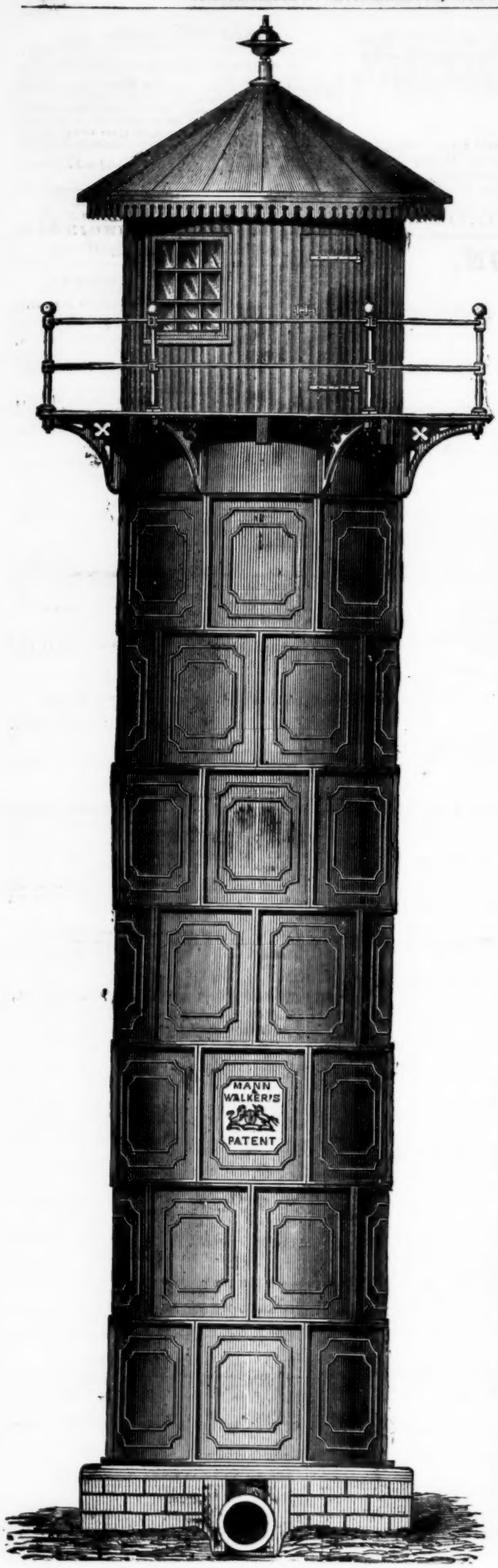
BUYERS OF COAL TAR,
And Crude Products therefrom,
AMMONIACAL LIQUOR, &c.

HOPKINS, GILKES, & CO.,

LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

A. FAIRLIE WILSON,

CONSULTING GAS ENGINEER,
34, ST. GEORGE'S ROAD, SOUTHWARK, S.E.
Reports and Valuations in the Management, Construction, and Structural Value of Gas-Works.



C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

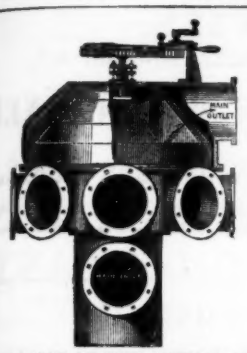
By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

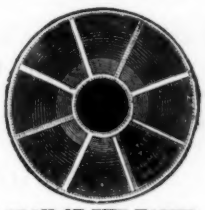
They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

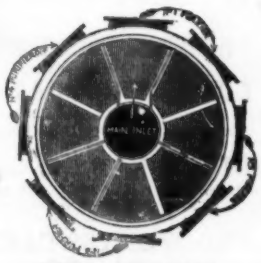
C. & W. WALKERS'
PATENT CENTRE-VALVES.



ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD,

MANUFACTURERS OF

RETORTS, ANNULAR AND PIPE CONDENSERS,

WROUGHT AND CAST IRON SCRUBBERS, PURIFIERS, GASHOLDERS,

GOVERNORS, AND ALL THE NECESSARY FITTINGS FOR COMPLETING THE ERECTION OF GAS-WORKS.

STATION & CONSUMERS WET OR DRY METERS, STREET & SERVICE MAINS, LAMP COLUMNS & BRACKETS, & WROUGHT-IRON TUBES AND FITTINGS; WROUGHT-IRON ROOFS FOR ANY SIZE OF BUILDINGS.

Sole Makers of B. W. Thurston's Combined Condensing, Scrubbing, and Washing Apparatus,

AND PATENTEES OF THE IMPROVED COMBINED CONDENSING AND PURIFYING APPARATUS SO EMINENTLY ADAPTED FOR EXPORTATION.

REFERENCES TO UPWARDS OF 300 GAS-WORKS.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS.

And all kinds of Experimental Gas Apparatus.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

IMPROVED CENTRE-VALVES,

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14⅛-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

PRICES ON APPLICATION, EITHER F.O.B. OR BY RAIL IN TRUCK LOADS.

THE TYNE COAL COMPANY, LIMITED, OWNERS.
W. RICHARDSON, Fitter,
29, QUAYSIDE, NEWCASTLE-ON-TYNE.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

MIDLAND & YORKSHIRE COMPANY,

COAL OWNERS AND FACTORS,

Supply to any Railway Station the best descriptions of Gas Coal, Nuts, and Cannel.

PRICES ON APPLICATION.

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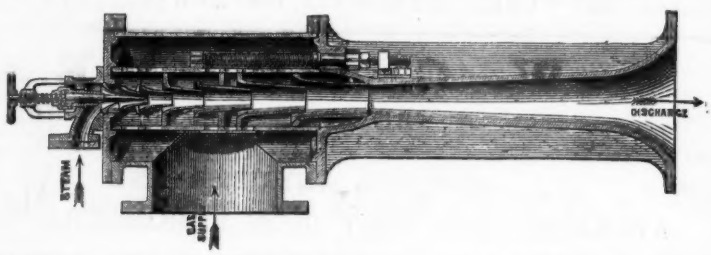

KÖRTING'S STEAM-JET GAS-EXHAUSTER.

IMPROVED CLELAND'S PATENT.

UPWARDS OF 250 IN USE.

CLELAND'S PATENT CONDENSER AND STEAM SCRUBBER.

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OR TO

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SOLE AGENT FOR ENGLAND AND WALES.

THE WIGAN COAL & IRON COMPANY,

LIMITED.

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN;

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

ALBERT GAS COAL.

THE DERBYSHIRE SILKSTONE COAL COMPANY, LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered in trucks at any Railway Station in England, or shipped on board at Hull, Grimsby Docks, or Barrow-in-Furness.

Purified gas per ton of coal in cubic feet (average)	10,775
Illuminating power in candles	14·71
Weight of coke in lbs. per ton of coal	1,502

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

HYDRATED PURIFYING MATERIAL.

Samples on application.

MESSRS. SPENCE BROS., LIMITED,

Will be glad to supply the above on the most favourable terms,

And to treat, by Purchase or Exchange, for Spent Oxide.

PRICES ON APPLICATION.

ALSO PATENT DRY COPPERAS FOR EXTRACTING AMMONIA.

VICTORIA CHEMICAL WORKS, BRADFORD, NEAR MANCHESTER.

Established

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR **LEEDS,**

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LIVERPOOL: Back Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 1000 days, and are yet in good order. References on application.

July 2, 1877.

NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.

A recent extensive development of the Collieries enables us to offer increased supplies.

JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—

"*Warrington Gaslight and Coke Company,*
Offices, Mersey Street, Warrington, April 23, 1877.

"MESSRS. NEWTON, CHAMBERS, AND CO.,

"GENTLEMEN,—After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

"The average of Nine samples gives a yield of **12,500** cubic feet of **15½**-Candle Gas, being equivalent to **664** lbs. of sperm per ton, and **1420** lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

"Yours truly, "JAMES PATERSON."

Full particulars will be sent on application to us—address as above.

NEW PATENT WET GAS-METER,

THE "RELIANCE,"

MANUFACTURED BY THE

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

Accuracy is obtained by subjecting the whole of the water which determines the measuring chambers of the drum to one uniform even pressure, and so prevents unequal displacements of the water-line.

The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

GAS-METER COMPANY, LIMITED,

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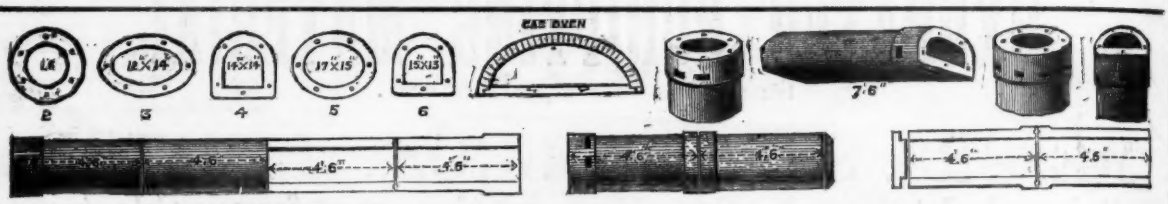

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Proprietors of Best Clay Mines. Largest makers in the World of Gas-Retorts, Lumps, Tiles, Fire-Bricks, and Fire-Clay Goods of all kinds. Large Stock of Retorts always on hand. Orders for any Size executed on receipt.

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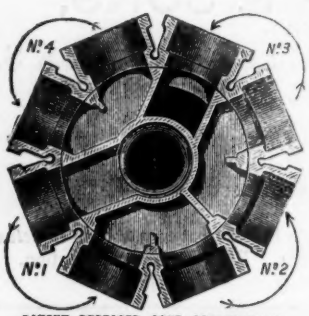
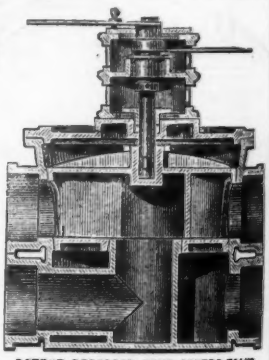
Constructed on the principle of the ordinary Plug-Cock.

THROUGH-WAY & FOUR-WAY COCKS

Of all descriptions.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Plan.



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Invite the attention of Gas Companies, Corporations, and others to their

PATENT STREET LAMPS,

Which are so constructed that neither putty nor other materials are required to secure the glass. No hacking out of old putty, which frequently destroys the frames. A new pane of glass can be inserted in two or three minutes by any inexperienced person, the glass being secured by a hinged flap and turn button.

PRICE 10s. each, net. Special quotations for large quantities.
Also made EXTRA STOUT recommended for its durability, PRICE 11s. 6d. each.

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By the use of which stoppages in service and other pipes are freed from naphthaline and other obstructions in a few minutes. PRICE 73s. net.

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For inserting in mains, to prevent the excess of pressure in high ground, or other elevated positions.

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Makers of all kinds of Pressure-Gauges, Gaseliers, and every kind of Gas-Fittings for the Trade.

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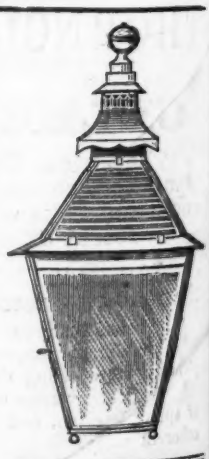

55 and 56, HIGH HOLBORN, LONDON.

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